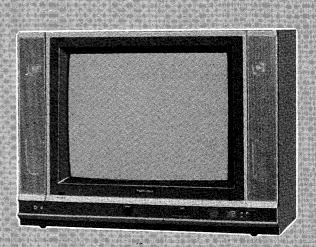
# **TOSHIBA**

TELETEXT COLOUR TELEVISION

# 211T4W



	SPECIFICATIONS
INPUT POWER RATING	100 watts (nominal), 220 volts AC, 50Hz
AERIAL INPUT IMPEDANCE	75 ohm unbalanced type for VHF and UHF
RECEIVING CHANNELS	VHF channels
INTERMEDIATE FREQUENCIES	Picture I-F carrier frequency
CHASSIS CONSTRUCTION	IC-Solid State, Horizontal Chassis
PICTURE TUBE	21 in. A51EAL00X01, 510 mm (measured on diagonal of viewable picture area), $90^{\circ}$ Deflection
SOUND OUTPUT	5.0 watts (at 10% harmonic distortion), Max. 6.5 watts x 2
SPEAKER	Wooter: 57 x 70 mm oval, 2 pcs Tweeter: 50 mm round, 2 pcs
AUX. TERMINAL	Headphone Jack, 21 pin socket
CABINET	Table type
DIMENSION	Height
WEIGHT (NET)	31.5 kg

### SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION," "SAFETY PRECAUTION" AND THE "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

### X-RAY RADIATION PRECAUTION

- 1. The E.H.T. must be checked every time the receiver is serviced to ensure that the C.R.T. does not emit X-ray radiation as result of excessive E.H.T. voltage. The nominal E.H.T. for this receiver is 24.5 kV at zero beam current (minimum brightness) operating at 240V a.c. The maximum E.H.T. voltage permissible in any operating circumstances must not exceed 26.5 kV. When checking the E.H.T., use the 'High Voltage Check' procedure on page 4 in this manual using an accurate E.H.T. voltmeter.
- The only source of X-RAY radiation in this receiver is the C.R.T. To prevent X-ray radiation, the replacement C.R.T. must be identical to the original fitted as specified in the Parts List.
- 3. Some components used in this receiver have safety related characteristics preventing the C.R.T. from emitting X-ray radiation.
  - For continued safety, replacement component should only be made after referring the Product Safety Notice below.

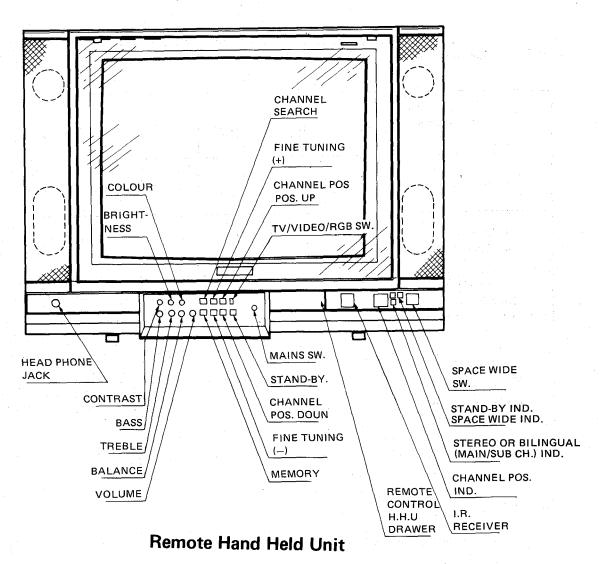
### SAFETY PRECAUTION

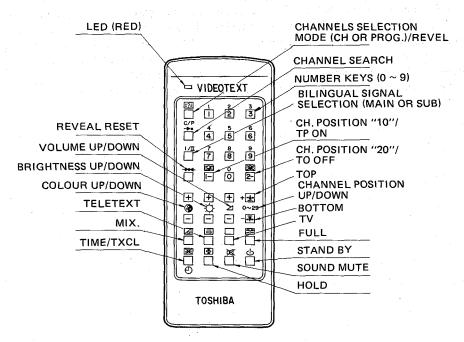
- This receiver has a nominal working E.H.T. voltage of 23 kV. Extreme caution should be exercised when working on the receiver with the back removed.
  - Do not attempt to service this receiver if you are not conversant with the precautions and procedures for working on high voltage equipment.
  - When handling or working on the C.R.T., always discharge the anode to the receiver chassis before removing the anode cap.
  - The C.R.T., if broken, will violently expel glass fragments and handling faulty or new C.R.T.'s should be carried out with extreme care.
  - Do not hold the C.R.T. by the neck as this is a very dangerous practice.
- It is essential that to maintain the safety of the customer all cable forms be replaced exactly as supplied from factory.
- 3. A small part of the chassis used in this receiver is, when operating, at approximately half mains potential at all times. It is therefore essential in the interest of safety that when serving or connecting any test equipment the receiver should be supplied via a suitable isolating transformer of adequate rating.
- 4. Replace blown fuses within the receiver with the fuse specified in the parts list.
- 5. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by shading on the circuit diagram and parts list, it must be a Toshiba approved type and must be mounted as the original.
- Keep wires away from high voltage or high temperature components.

### PRODUCT SAFETY NOTICE

Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by shading on the schematic diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.

### FRONT CONTROLS VIEW





### 21 PIN CONNECTOR

211T4W is equipped with 21 pin connector on the back. Mode selection map is as follows. (Mode SW., TV-VIDEO-RGB, is located in the door).

Mode SW. selection Signal	TV	VIDEO	RGB	Note
Normal TV	•		*	* When pin 8 of 21 pin socket is "Low", normal TV signal can be received also in this position
TELETEXT  —availabel on	•	* *		** Teletext signal from 21 pin socket can be received.
Various signal from 21 pin	•		•	Pins 8 and 16 of 21 pin socket are "High".
AV signal from 21 pin (VCR signal)		•	* * *	*** When pin 8 of 21 pin socket is "Low", normal TV signal can be received also in this position.
Normal TV signal and signals from 21 pin (Mixture)	* * * *		* * * *	**** When rapid blanking signal is added to pin 8 of 21 pin socket, Mixture-display of TV and 21 pin signals is available.

#### Remarks;

- 1) On usual condition, the positions marked with should be recommended to avoid confusion on the selection of mode sw.
- 2) To receive TV signal in the position of "TV", external unit connected to the 21 pin socket must be switched off. (Mode switching from 21 pin to TV can not automatically be done by only switching the mode sw.)
- 3) In case teletext signal is received in the position "TV" and then mode sw. is switched to the "RGB" position to receive 21 pin or TV signal, resetting of the remote control circuit condition to "TV" by pressing "TV Button on the remote H.H.U. before switching mode sw. should be recommended.

  If not, restoration of teletext pages would be lost by pressing channel selector buttons on the remote H.H.U.

while receiving in the "RGB" position.

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION," "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 1 OF THIS MANUAL.

### INSTALLATION AND SERVICE ADJUSTMENTS

### **GENERAL INFORMATIONS**

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials.

Plug the power cord into a convenient 220 volts 50Hz AC two pin power outlet.

Turn the receiver ON

Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

### **AUTOMATIC DEGAUSSING**

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after Mains switch is switched ON. If the set is moved or faced in a different direction, the Mains switch must be switched off at least 10 minutes in order that the automatic degaussing circuit operates properly.

Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures, as mentioned later.

### HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

- 1. Connect an accurate high voltage meter to the second anode of the picture tube.
- Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current)
- 3. High voltage will be measured below 26.5kV.
- Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 26.5kV under any conditions.

### HORIZONTAL OSCILLATOR ADJUSTMENT

If there is an indication of unstable horizontal sync., adjust the HORIZONTAL HOLD Control (R451) to remove the condition. Adjust the HORIZONTAL HOLD to the centre of the pull-in range.

### VERTICAL OSCILLATOR ADJUSTMENT

If the picture moves up or down on the screen, adjust the VERTICAL HOLD Control (R351) until there is a single image without vertical movement.

### **HEIGHT ADJUSTMENT**

HEIGHT Control (R352) on MAIN Board changes the size of the picture or pattern, having an equal effect on the top and bottom. Make final adjustment to overscan the mask 2cm at top and bottom.

#### **FOCUS ADJUSTMENT**

Adjust FOCUS Control on FLYBACK TRANS. (T461) for well defined scanning lines in the centre area on the screen.

### **DELAYED R-F AGC ADJUSTMENT**

- 1. Tune the set in the strongest station in your area.
- 2. Turn AGC DELAY Control (R151) on MAIN Board to fully counterclockwise position.
- 3. Adjust AGC DELAY Control clockwise until noise (snow) is reduced to minimum on the picture.

### COLOUR SYNC, ADJUSTMENT

- 1. Tune in a colour programme (preferably colour bar signal) and warm up for five minutes.
- 2. Shortcircuit C512 on Main Board with a short jumper wire.
- 3. Connect pin 12 of IC501 to +12V line via a 10k ohm resistor, this will disable the colour killer.
- 4. Then the colour stripes appear on the screen when the adjustment is incorrect. Adjust the colour sysnc. VR (R552) so that the colour bar pattern stands still or drifts slowly across the picture screen.
- 5. Remove the 10k ohm resistor and jumper wire.

#### PAL MATRIX ADJUSTMENT

- Tune in the colour programme including the colour bar signals
- Set the COLOUR Control VR to obtain the proper colour.
- If the PAL MATRIX adjustment is incorrect, the Venetian Blind effect would appear in the colour bars area. This case needs the adjustment.
- 4. At the first, adjust DL PHASE ADJ. Coil (L551) to minimize the Venetian Blind effect.
- Next, connect a capacitor (30 to 50pF) to the capacitor C512 in parallel. If the Venetian Blind increases, adjust 1H AMP ADJ. VR (R551) to minimize the Blind.
- If, after removing the capacitor, the effect persists, repeat items 4 and 5 until it is eliminated, even when the capacitor is connected.
- After removing an additional capacitor (30 to 50pF), set COLOUR control to low saturation and adjust coil L552 for maximum colour saturation.

### CRT GREY SCALE ADJUSTMENT

- 1. Tune in an active channel.
- 2. Set the COLOUR Control to minimum.
- 3. Set the mode SW. SE01 in the "TV" position.
- 4. Turn the SCREEN Control (on T461) fully counter-clockwise
- By rotating the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) clockwise from the minimum, set them to the mid position.
- Set the GREEN and BLUE DRIVE Controls (R252, R253) to the mid position.
- Remove the 2 pin jumper (MH08) connector on the 21 pin board.
- 8. Short temporarily terminals ( ) and (H) (P530) on the MAIN Board with a jumper wire.
- Rotate the SCREEN Control gradually clockwise until the first horizontal line of a colour (RED, GREEN or BLUE) appears slightly on the screen.
   Set the SCREEN Control to this position.
  - At the base of the colour, rotate the remaining two CUT OFF Controls gradually clockwise until the horizontal lines of each colour appear slightly on the screen
  - Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE).
  - The lines may look like white if the CUT OFF Controls are adjusted properly.

- 10. Remove a jumper wire between terminals ① and Ĥ and reconnect MH08.
- 11. Rotate the BRIGHTNESS and CONTRAST Controls to the maximum.
- 12. Adjust the BLUE and GREEN DRIVE Controls (R252/R253) to obtain proper white-balanced picture in high light areas.
- 13. Rotate the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls and DRIVE Controls to obtain a good white balance in both low and high light areas.

### **SUB-BRIGHTNESS ADJUSTMENT**

- 1. Tune in a colour programme.
- Set the CONTRAST Control to the maximum and the BRIGHTNESS Control to the centre (click-position).
- 3. Set the COLOUR Control to the centre.
- 4. Set the SUB-BRIGHT. Control (R255) to the centre and leave the receiver for five minutes in this state.
- 5. Watching the picture well, adjust the SUB-BRIGHT. Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
- Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
- 7. If the picture does not appear dark with the CONT-RAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the Controls turned to the maximum, adjust the SUB-BRIGHT. Control again for the acceptable picture.

# COLOUR PURITY AND CONVERGENCE ADJUSTMENT

It should be remembered that the purity magnet and Deflection Yoke form part of the integrated tube components' assembly.

As these were aligned and fixed during manufacture, it is advisable that the sealing compound should not be broken and the replacement of the whole picture tube with neck components should be taken for servicing.

However the typical procedure for some model is described as follows only for reference.

**Note:** Before attempting any purity and/or convergence adjustments, the receiver should be operated for at least fifteen minutes.

### **COLOUR PURITY ADJUSTMENT**

- Demagnetize the picture tube and cabinet using a degaussing coil.
- Turn the CONTRAST and BRIGHTNESS Controls to maximum.
- Adjust RED and BLUE CUT OFF controls (R557 and R559) to provide only a green raster. Advance the GREEN CUT OFF Control (R558) if necessary.
- 4. Loosen the clamp screw holding the yoke, and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
- 5. Remove the Rubber Wedges.
- 6. Rotate the lock ring (See figure 1) clockwise to loosen. Rotate and spread the tabs of the purity magnet (See figure 3) around the neck of the picture tube until a green belt is obtained in the centre of the screen. And at the same time, centre the raster vertically by adjusting the magnet. After the above adjustment, rotate the lock ring counterclockwise to lock tightly.
- Move the yoke slowly forward or backward until a uniform green screen is obtained. Tighten the clamp screw.
- 8. Check the purity of the red and blue raster by adjusting the CUT OFF Controls.
- 9. Tighten the clamp screw of the yoke temporarily.
- Obtain a white raster; referring to "CRT GREY SCALE ADJUSTMENT".
- 11. Proceed with convergence adjustment.

### **CONVERGENCE ADJUSTMENTS**

### ■ Centre Convergence Adjustment

- Receive crosshatch pattern with a colour bar signal generator.
- Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
- 3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 2.) and superimpose red and blue vertical lines in the centre area of the picture screen. (See figure 3.).
- 4. Turn the both tabs at the same time keeping the constant angle to superimpose red and blue horizontal lines at the centre of the screen. (See figure 3.)
- Adjust two tabs of 6-Pole Magnets to superimpose red/ blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
- Repeat adjustments 3, 4, 5 with understanding red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual affection and it makes dots movement complex.

### ■ Circumference Convergence Adjustment

- Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
- 2. Put a wedge as shown in figure 1 temporarily. (Do not remove cover paper on adhesive part of the wedge.)
- Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 3.) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
- 4. Put other wedge into bottom space and remove the cover paper to stick.
- 5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 3.).
- 6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
- Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the voke.
- After fixing three wedges, recheck overall convergence.
   Tighten the screw firmly to fix the yoke and check the yoke is firm.
- 9. Stick 3 adhesive tapes on wedges.

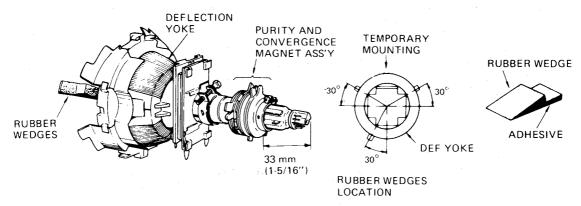
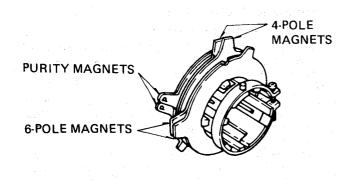


Figure 1.



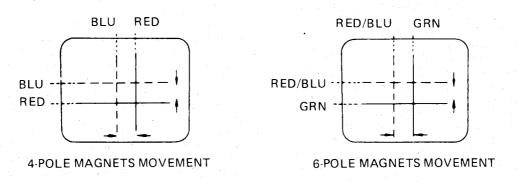
ADJUST THE ANGLE
(VERTICAL LINES)

ROTATE TWO TABS
AT THE SAME TIME
(HORIZONTAL LINES)

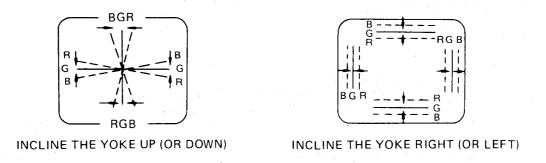
CONVERGENCE MAGNET ASSEMBLY

ADJUSTMENT OF MAGNETS

Figure 2.



Center Convergence by Convergence Magnets



Circumference Convergence by DEF Yoke

Figure 3. Dot Movement Pattern

### **GENERAL ALIGNMENT INSTRUCTIONS**

#### 1 GENERAL

The alignment procedures described below should only be used when absolutely necessary.

The test equipment, alignment procedures and bias values specified must be used to ensure the correct operation of the television receiver.

### **2 EQUIPMENT TERMINATION**

The alignment pads and probes have been designed to give optimum results when used with the specified test equipment. Incorrect matching will produce distorted waveforms or voltages making accurate alignment impossible. To avoid stray pick-up, when consturcting pads and probes, keep any unshielded leads below 2.5 cm in length.

#### 3 SIGNAL OVERLOADING

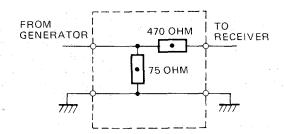
When using the sweep generator, keep the output as low as possible to avoid overloading. To check for this condition, turn the sweep generator output to minimum and then gradually increase the level until a response is obtained. If the level is then increased further, it should only change the amplitude and not the configuration of the response. If the response begins to flatter at the top or to drop below the base line, decrease the sweep generator output to restore the correct configuration of the response.

The oscilloscope gain should be as high as possible to maintain a usable pattern with the peak to peak values stated. This procedure will allow the sweep generator output to be kept low and thus avoid overloading.

If 'markers' from a marker generator are inserted, the response should not be distorted.

### 4 TEST EQUIPMENT REQUIRED

- 1. Wide Band Oscilloscope
- 2. Colour Bar/Dot/Crosshatch Generator
- 3. TV Sweep and Marker Generator
- 4. High Impedance Voltmeter or DVM
- 5. Multimeter
- 6. AGC Bias Supply (12V, 300 mA)
- 7. Direct Low Capacitance Probe
- 8. Matching Pad (See the figure bellow.)
- 9. External Degaussing Coil
- Microscope, 10 or 12 times magnification (approximately), to allow observation of the dot structure of the C.R.T.



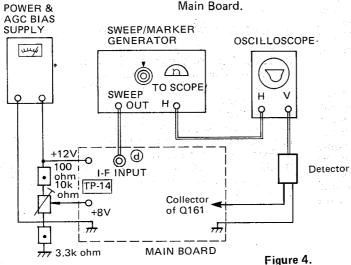
Matching Pad

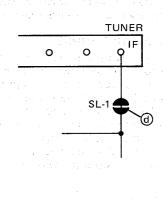
### PICTURE I-F TRAP ALIGNMENT

Perform this adjustment prior to I-F SWEEP and AFC ALIGNMENTS. Refer to Figure 4 for the equipment connection. PRELIMINARY STEPS . . . . . . . . 1. Disconnect the solder link SL-1 ( - see Figure 4) on the foil side of the Main Board. 2. Supply +12 volts to the Main Board. 3. Supply +8 volts bias to terminal "TP-14" on the Main Board. 4. Turn AGC DELAY Control (R151) on the Main Board fully clockwise.

SWEEP/MARKER GENERATOR . . . . Connect to the point (d) as shown in Figure 4 on the Main Board.

OSCILLOSCOPE ...... Connect through the detector (See figure 6.) to the collector of Q161 on the Main Board.





STEP	SWEEP/MARKER GENERATOR	ADJUST	PROCEDURE	
TRAP ALIGNMENT  Control the sweep output for easy alignment. (See Figure 5.). Set the IF makers for 40.4MHz (P + 1.5MHz) and 31.9MHz (P-7MHz).				
Trap coil L107	40.4MHz Marker "ON" L107		Adjust L107 so the 40.4MHz marker point is placed at bottom of response. (See Figure 6.)     Adjust L108 so the 31.9MHz marker point is	
Trap coil L108	31.9MHz Marker "ON"		placed at bottom of response. (See Figure 5.)  3. Repeat items 1 and 2 above for the precise adjustment.	

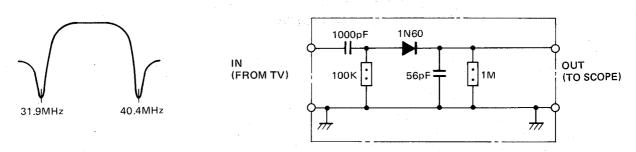


Figure 5. Trap Response

Figure 6. Detector Diagram

### PICTURE I-F SWEEP ALIGNMENT

GENERAL . . .

Refer to Figure 7 for test equipment connection.

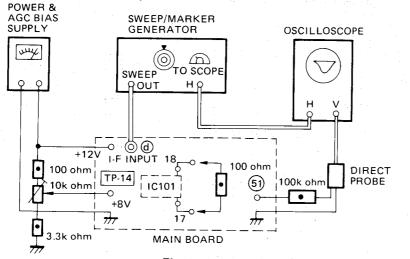
- 1. Disconnect the solder link SL-1 ( see Figure 7) on the foil side of the Main Board.
- 2. Supply +12 volts to the Main Board.
- 3. Supply +8 volts bias to terminal "TP-14" on the Main Board.
- 4. Turn AGC DELAY Control (R151) on the Main Board fully clockwise.

OSCILLOSCOPE .....

SWEEP/MARKER GENERATOR . . . . Connect to the point (d) as shown in Figure 7 on the Main Board.

Connect with direct probe to terminal 51 on the Main Board through 100k ohm

resistor.



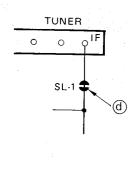


Figure 7. Picture I-F Sweep Alignment

STEP	SWEEP/MARKER GENERATOR	ADJUST	REMARKS
Set Oscilloscope gain fo	<b>L103</b> r 0.1 v/cm. Adjust sweep outp	ALIGNMEN out for easy	
Detector Coil (L103)	38.9MHz Maker "ON"	L103	Adjust L103 for maximum gain at 38.9 MHz on SCOPE. (See Figure 8.)
Observe with 0.5 volts pk Attach 100 ohm resistor I	OVERALL to pk on the oscilloscope. Detween pins 17 and 18 of IC1		
I.F. Overall Response	I.F Overall Response should	d be as show	n in Figure 9.

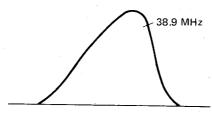


Figure 8. Magnified Response Curve

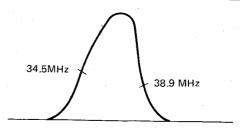
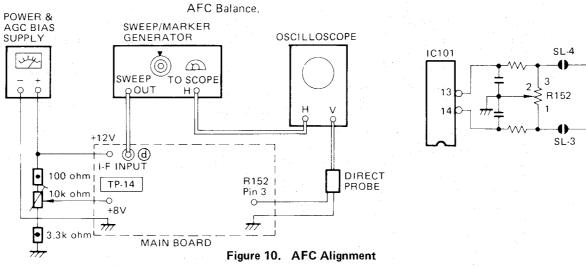


Figure 9. Overall Response Curve

### AFC ALIGNMENT

GENERALRefer to Figure 10 or test equipment connection.PRELIMINARY STEPS1. Disconnect the solder links SL-1, SL-3, SL-4 ( → ▶ see Figures 7 and 10) on the foil side of the Main Board.2. Supply +12 volts to the Main Board.3. Supply +8 volts bias to terminal "TP-14" on the Main Board.4. Turn AGC DELAY Control (R151) on the Main Board fully clockwise.SWEEP/MARKER GENERATORConnect and tune following the same steps as given under PICTURE I-F SWEEP ALIGNMENTDVMConnect direct probe between pin 1 (+) and pin 3 (-) of terminals of R152.OSCILLOSCOPEConnect using direct probe to pin 3 of R152 on the Main Board, after adjusting



STEP	SWEEP/MARKER GENERATOR	ADJUST	REMARKS
1. AFC Balance	NO SIGNAL	R152	Connect DVM(—) to pin 3 of R152 and (+) to pin 1 of R152.  Adjust R152 (BALANCE ADJUST) for 0 volt reading on meter.
2. AFC Detector	38.9 MHz	L171	Remove the DVM. Connect Direct Probe to Terminal pin 3 of R152 on Main Board. Adjust L171 for the response shown in Figure 11.

After completing the above steps, disconnect the equipment and re-solder the solder links. Check AFC operation is normal.

Readjust AGC DELAY control (R151) following DELAYED R-F AGC ADJUSTMENTS.

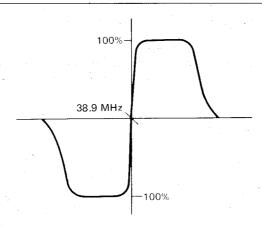


Figure 11. AFC Response

# MPX (Multiplex TV Sound) BOARD ALIGNMENT

GENERAL ..... Refer to figure 12 for test equipment connection.

PRELIMINARY STEPS . . . . . . . . . 1. Disconnect IF cable from the pin-jack (PD01) on MPX Board.

2. Connect other connectors in the TV normally.

3. Supply +12V to Main Board from external DC supply.

EQUIPMENT CONNECTION . . . . . . See figure 12.

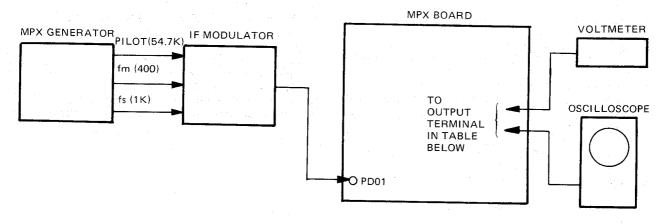


Figure 12.

### MPX ALIGNMENT STEPS

	<del>,</del>	<u> </u>	
STEP	OUTPUT TERMINAL	TEST SIGNAL	PROCEDURE
SIF INTER- CARRIER DET. COIL (LD03)	TP-12M	IF carrier 38.9MHz	<ol> <li>Keep the level at PD01 to 70 to 80 dBμV.</li> <li>Apply +8 to +9V bias to TP-14M.</li> <li>Adjust LD03 for the minimum reading on the voltmeter.</li> </ol>
SIF (5.5MHz) DET. COIL (LD05)	TP-22M	IF signal P: No modulation $80dB\mu V$ . S1 (5.5MHz): $fm = 400Hz$ $\triangle f = \pm 30kHz \text{ dev.}$	<ol> <li>Arrange IF signal as described left.</li> <li>Connect voltmeter to TP-22M.</li> <li>Adjust LD05 for the maximum reading on the voltmeter.</li> </ol>
SIF (5.74MHz) DET. COIL (LG03)	TP-24M	67dBµV S2 (5.74MHz): fm = 1000Hz △f = ±30kHz dev. 60dBµV MPX Mode: <b>DUAL</b>	<ol> <li>Arrange IF signal as described left.</li> <li>Connect voltmeter to TP-24M.</li> <li>Adjust LG03 for the maximum reading on the voltmeter.</li> </ol>
BILINGUAL FILTER (274.1Hz) (RG51)	ICG12 #15 #5	WIT X WIOGE. DOAL	<ol> <li>Arrange IF signal as described left.</li> <li>Connect oscilloscope to ICG12 #15 #5.</li> <li>Adjust RG51 for the 0v amplitude of 274Hz element.</li> </ol>
STEREO SEPARATION (RG50)	TP-23L	IF signal P: No modulation $80dB\mu V$ . S1 (5.5MHz): No modulation $67dB\mu V$ . S2 (5.74MHz): fm = 1000Hz $\Delta f = \pm 30kHz$ 60dB $\mu V$ MPX Mode: STEREO	<ol> <li>Arrange IF signal as described left.</li> <li>Connect oscilloscope to TP-23L.</li> <li>Adjust RG50 for the minimum amplitude of 1000Hz element.</li> </ol>

### 21 PIN AND TELETEXT BOARD ALIGNMENT

# CHARACTER WHITE BALANCE ADJUSTMENT (RH51, RH52, RH53)

**Note:** This adjustment must be done after sub-brightness adjustment on page 5 is finished.

- Check the white balance of the regular TV picture for normal.
- Receive the regular TV picture and set the Colour control to minimum.
- 3. Set the mode SW. SE01 in the "TV" position.
- 4. Rotate VR (RH51, RH52, RH53) fully counterclockwise.
- 5. Set Brightness Control VR to maximum.
- Short circuit 2-Pin plug (PH07) on the 21 pin Board and short circuit between terminals and And (P530) on the Main Board.
   Screen will show one horizontal line.
- Rotate VR (RH53) to the position where green color just appears on the horizontal line.
- 8. Adjust VR (RH51, RH52) for the white line on screen.
- 9. Remove short circuiting on the 21 pin and Main Boards.
- Check the white balance with a normal character signal received.

#### PICTURE POSITION ADJUSTMENT (RH54)

Some units which are connected to 21 pin socket may require adjustment of horizontal picture position. Rotate auxiliary VR on the back in that case. However, remember that the position of picture at normal TV signal is also shifed.

#### SAMPLING CLOCK COIL ADJUSTMENT (L02)

- Receive a teletext signal. (Set the TV in the Teletext mode.)
- Adjust the sample clock coil (LO2) to the position where the normal reception of teletext is obtained. (There must be no misoperation.)
- 3. Check the all text pages for normal reception.
- 4. If there is a misoperation, repeat the procedures 2 and 3 above.

# INFRARED SENSOR AMP ALIGNMENT (Remote Control Receiver)

more.

### TUNING FREQUENCY ADJUSTMENT

When LK01 or CK01 is replaced, readjustment is required. During adjustment, keep the VOLUME DOWN Button on the remote control hand unit pressed.

- 1. Turn the TV set on.
- 2. Connect an oscilloscope across CK01. (See figure 13.)
- Adjust LK01 for the maximum amplitude of waveform (See figure 14.) while holding down VOLUME DOWN Button on the hand unit.

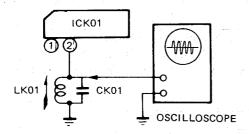


Figure 13. Equipment Connections

- 4. Rotate the core of LK01 for the maximum amplitude of waveform on the scope, clockwise from the fully counterclockwise position. (See figure 14.) Note: While adjustment, face the remote hand unit to such direction as to keep 1 Vp-p amplitude of wave-
- form to prevent the saturation of response.

  5. After completing adjustment, check the effective distance of the hand unit for approx. 5 meters or

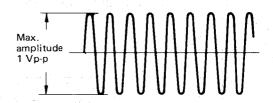


Figure 14. Waveform

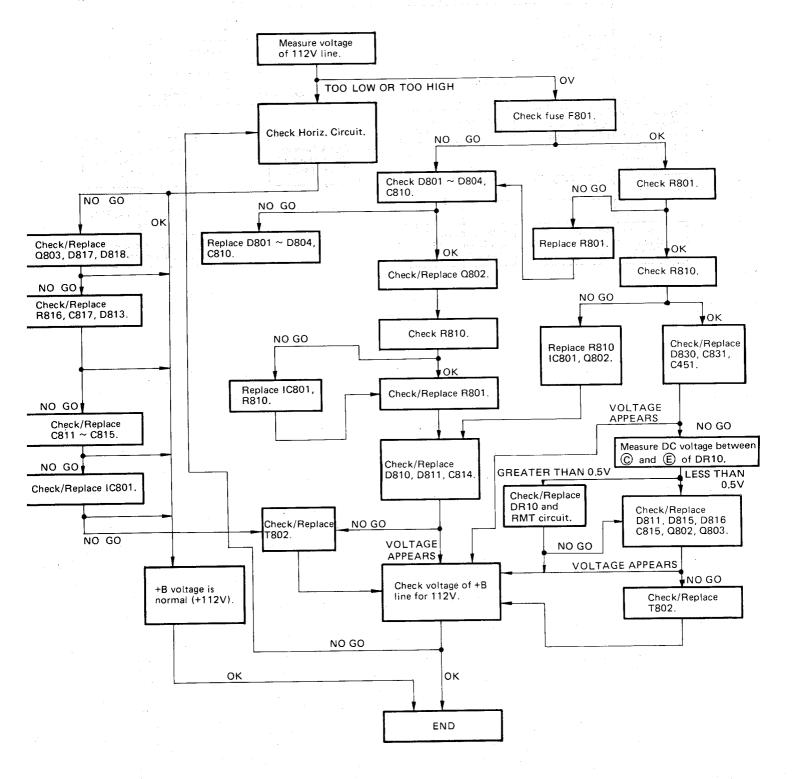
# TROUBLESHOOTING CHARTS

The following charts are devoted to troubleshooting which, if followed carefully, will assist you in tracking down a fault to the correct stage.

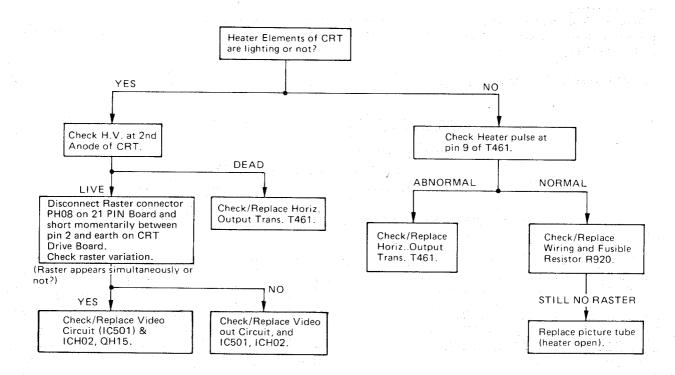
In order to utilize the charts (fault trees), firstly establish the complaint, i.e. — No Raster, No Sound.

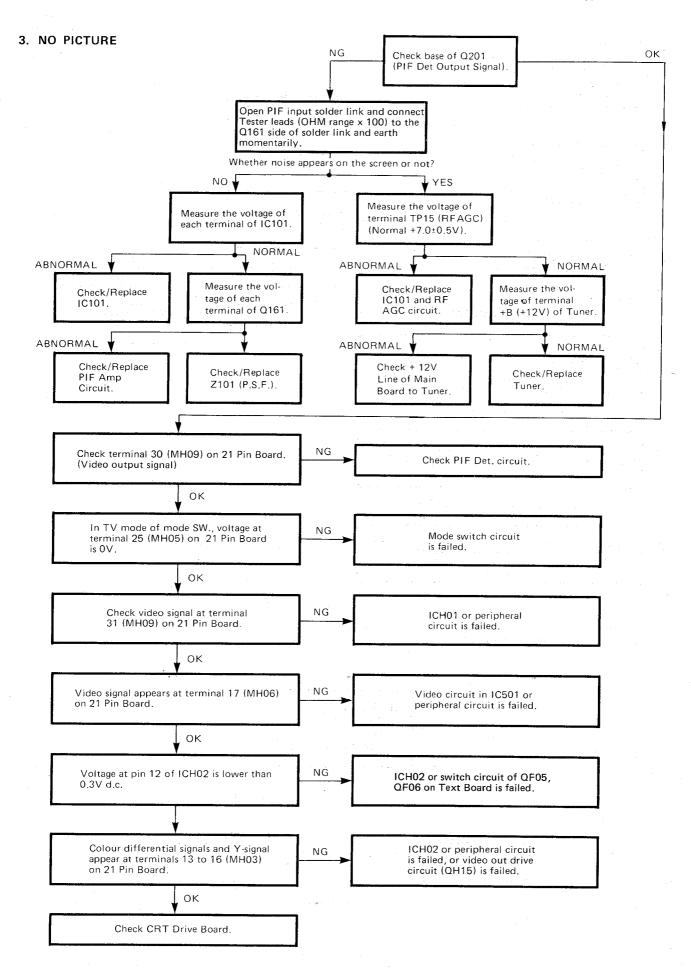
Locate the chart applicable and then progress through the various alternatives until a final block indicates the offending components or stage.

### 1. NO RASTER AND NO SOUND

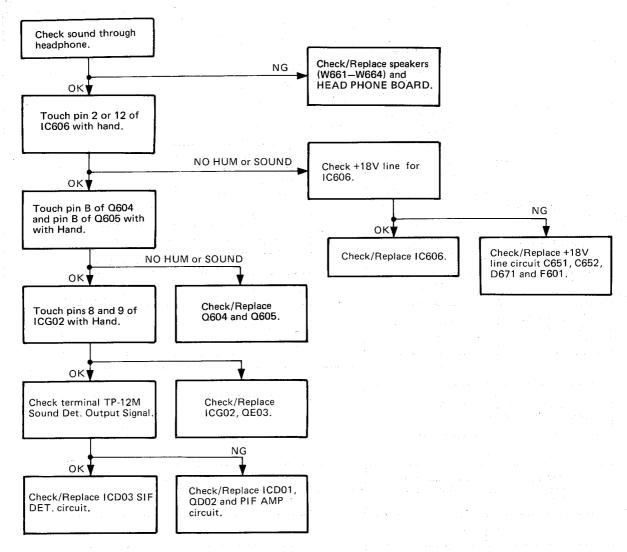


### 2. NO RASTER (SOUND OK)

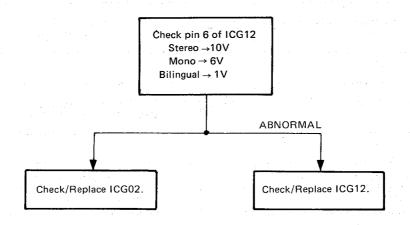




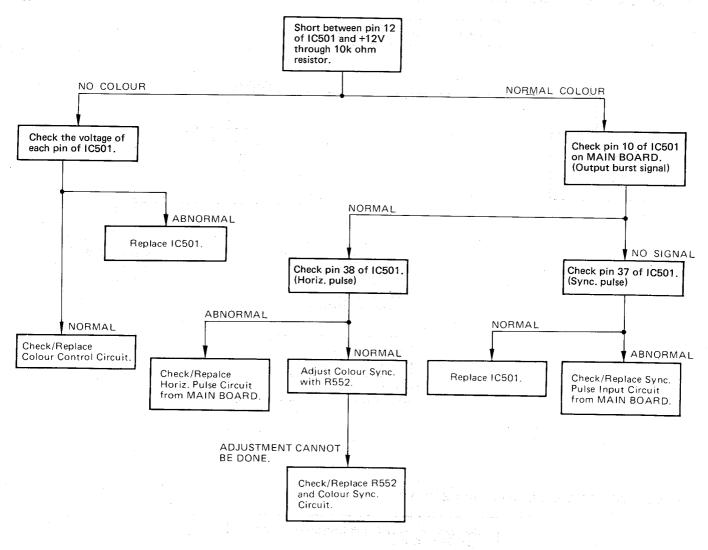
### 4. NO SOUND



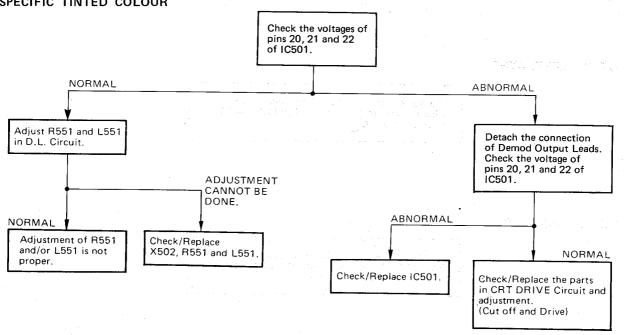
### 5. NO STEREO and NO BILINGUAL



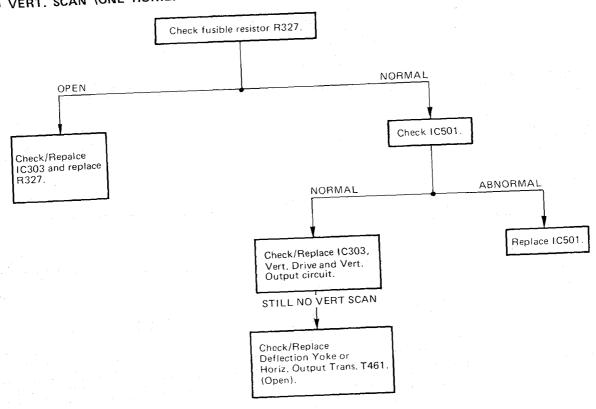
### 6. NO COLOUR



### 7. SPECIFIC TINTED COLOUR



# 8. NO VERT. SCAN (ONE HORIZ. LINE RASTER)



# 9. OUT OF VERT. SYNC. AND HORIZ. SYNC.

Check/Replace Sync. Circuit from pin 40 of IC501 to pin 37 or IC501.

# 10. OUT OF VERT. SYNC.

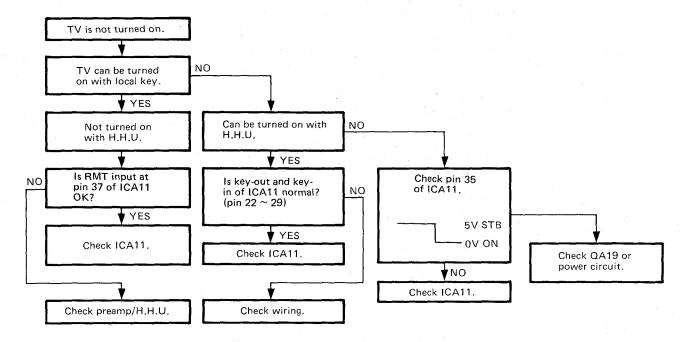
Check/Replace Vert. OSC Circuit and Vert. Hold Circuit connected to pins 26, 27 and 29 of IC501 Check/Repalce IC501.

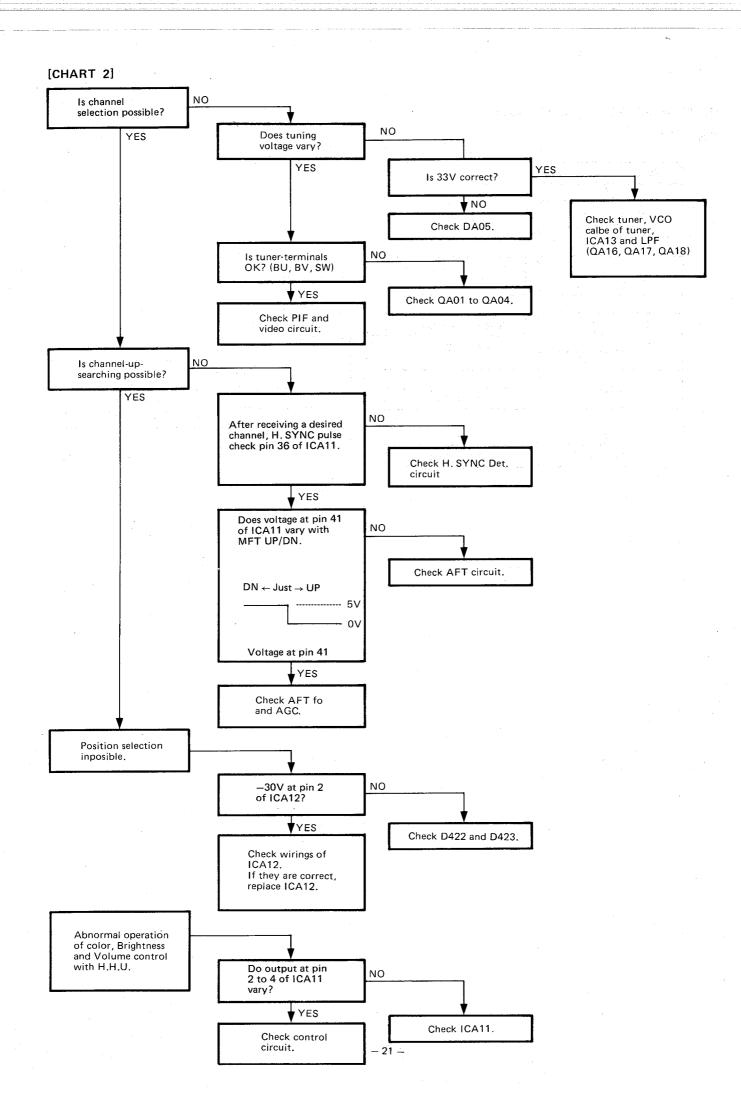
# 11. OUT OF HORIZ. SYNC.

Check/Repalce Horiz. OSC Circuit, Horiz. Hold and Horiz. AFC Circuit connected to pins 33 and 34 of 1C501. Check/Replace IC501.

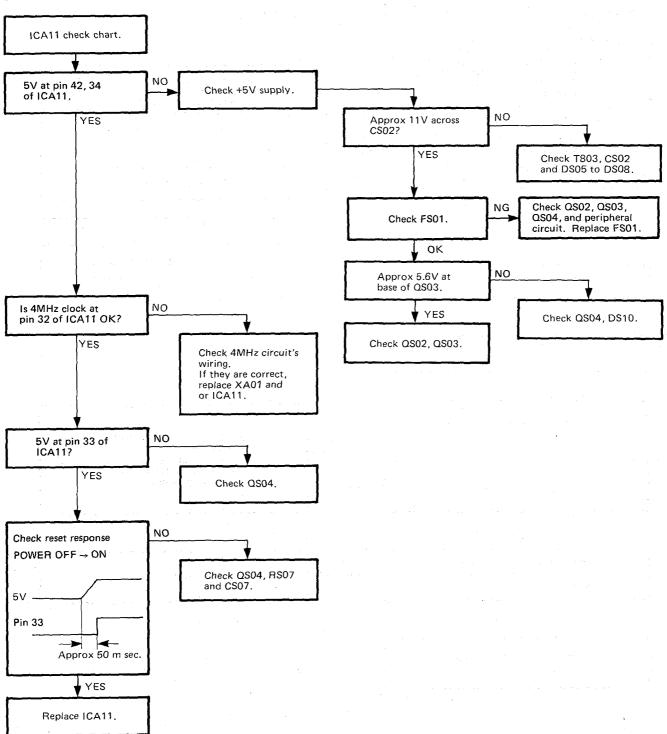
### 12. CHANNEL SELECTOR TROUBLE

### [CHART 1]



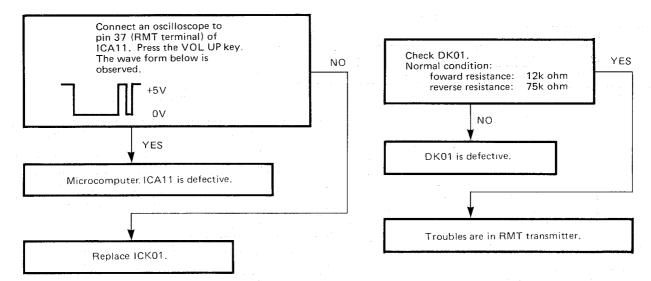




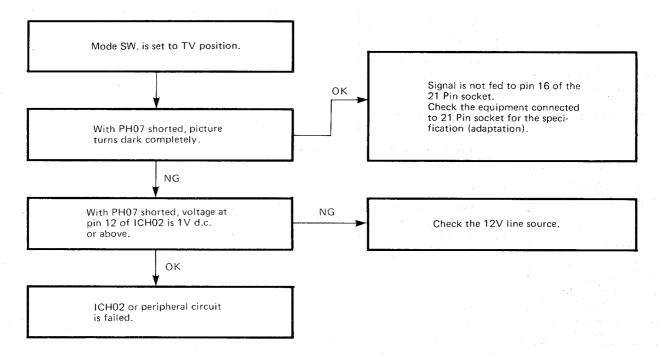


### 13. REMOTE CONTROL OPERATION CHECK

Note: Before checking RMT operation, check that local key operation is proper.

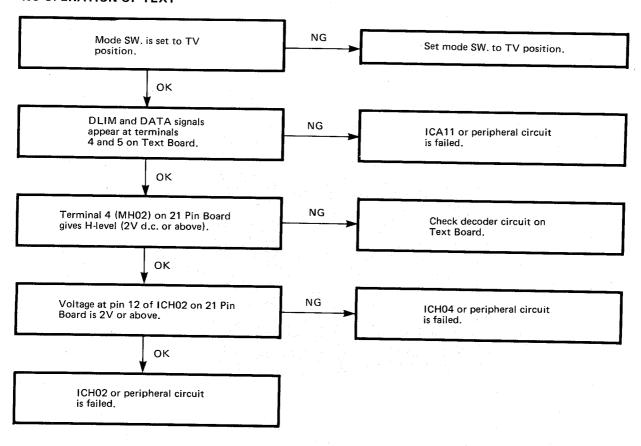


### 14. NO OPERATION OF RGB (21 PIN)

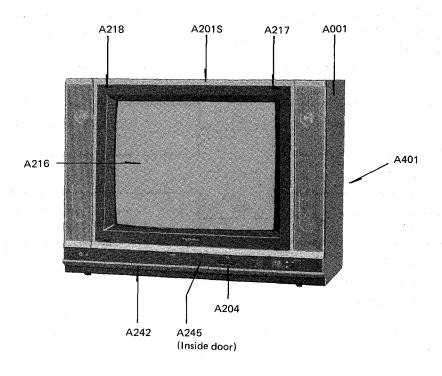


### 15. 21 PIN/TEXT TROUBLE

### ■ NO OPERATION OF TEXT



# CABINET REPLACEMENT PARTS LIST



Reference No.	Part No.	Description
A001	23887563	Wood Cabinet
A201S	23807250	Front Panel
A206	23832490	Bottom Cover
A207	23886878	Lens
A211	23832493	Case Proper (A)
A212	23832491	Upper Cover
A213	23848513	Push Catch, RMT
A216	23827691	Glass, Filter
A217	23846753	Piece, Glass Holding, Right
A218	23846752	Piece, Glass Holding, Left
A219	23858872	Rubber
A242	23830058	Door
A243	23848226	Push Catch, Door

Reference No.	Part No.	Description
A245	23874579	Knob, Mains
A246	23835863	Spring
A401	23990207	Back Cover
A411	23992455	Label, Model Number
A603	23874860	Knob, Small
A701	23924725	Carton, Packaging
A702	23934850	Packing, Top
A703	23934849	Packing, Bottom
A710	23992454	Model No. Label, Case
K902	23120764	Remote Control Hand Held
·		Unit, CT-9140
Y101	23994082	Owner's Manual
		:

### CHASSIS PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 1 OF THIS MANUAL.

**CAUTION:** The shaded areas and  $\triangle$  marks in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types indentical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 1. Do not degrade the safety of the receiver through improper servicing.

NOTICE: The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.

### ABBREVIATIONS:

Capacitors . . . CD: Ceramic Disk, PF: Plastic Film, EL: Electrolytic

Resistors . . . . CF: Carbon Film, CC: Carbon Composition, OMF: Oxide Metal Film, VR: Variable

Resistor. MF: Metal Film, FR: Fusible Resistor

(All CD and PF capacitors are ±5%, 50v and all resistors, ±5%, 1/6w unless otherwise noted.)

Location No.	Part No.	Description	
CAPACIT	ORS		**
CO1	24636010	EL, 1μF, 50V	
C02	24634100	EL, 10μF, 25V	
C03	24212102	CD, 1000pF, ±10%	
C04	24436331	CD, 330pF	
C05	24436470	CD, 47pF	
C06	24538104	PF, 0.1μF	
C07	24232103	CD, 0.01µF, +80%, -2	:0%
C08	24436470	CD, 47pF	
C09	24353160	CD, 16pF	
C11	24538104	PF, 0.1μF	
C13	24636010	EL, 1μF, 50V	
C14	24634100	EL, 10μF, 25V	
C15	24593392	PF, 3900μF	
C16	24636010	EL, 1μF, 50V	
C17	24538104	PF, 0.1μF	
C18	24634101	EL, 100μF, 25V	
C19	24212102	CD, 1000pF, ±10%	
C20	24212102	CD, 1000pF, ±10%	
C21	24212102	CD, 1000pF, ±10%	v"
C22	24633101	EL, 100µF, 16V	
C32	24212102	CD, 1000pF, ±10%	1
C33	24436270	CD, 27pF	
C101	24212102	CD, 1000pF, ±10%	
C102	24212102	CD, 1000pF, ±10%	
C103	24232103	CD, 0.01µF, +80%, -2	.0%
C104	24232103	CD, 0.01µF, +80%, -2	0%
C105	24636229	EL, 2.2μF, 50V	
C106	24617969	EL, 0.22μF, 50V	
C107	24636100	EL, 10μF, 50V	
C108	24232103	CD, 0.01µF, +80%, -2	.0%
Ç110	24232103	CD, 0.01µF, +80%, -2	:0%

Location No.	Part No. Description	
C111	24212222 CD, 2200pF, ±10%	
C113	24232103 CD, 0.01μF, +80%, -20	)%
C115	24212102 CD, 1000pF, ±10%	1.46
C161	24212102 CD, 1000pF, ±10%	
C162	24232103 CD, 0.01μF, +80%, -20	)%
C163	24212102 CD, 1000pF, ±10%	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
C164	24212102 CD, 1000pF, ±10%	38 8 T
C165	24356221 CD, 220pF	4 9 -
C171	24212102 CD, 1000pF, ±10%	13.3
C172	24212102 CD, 1000pF, ±10%	
C174	24436130 CD, 13pF	ert gre
C175	24436020 CD, 2pF, ±0.25pF	Calaba
C176	24436020 CD, 2pF, ±0.25pF	all Marie
C177	24085031 EL, 1µF, ±20%, 25V,	477
Sept. Sept.	Non-Polar	200
C202	24436390 CD, 39pF	1927
C204	24636010 EL, 1μF, 50V	**************************************
C207	24636100 EL, 10μF, 50V	200
C210	24436101 CD, 100pF	Truste - 1
C219	24633100 EL, 10μF, 16V	111
C240	24636479 EL, 4.7μF, 50V	g 100
C242	24636010 EL, 1μF, 50V	23 B
C301	24636010 EL, 1μF, 50V	41115
C303	24212561 CD, 560pF, ±10%	ar its.
C304	24212681 CD, 680pF, ±10%	1.7
C305	24538333 PF, 0.033μF	
C306	24538224 PF, 0.22μF	
C307	24212101 CD, 100pF, ±10%	
C309	24617981 EL, 2.2 $\mu$ F, $\pm 10\%$ , 50V	
C310	24636478 EL, 0.47μF, 50V	A 194
C311	24796102 EL, 1000μF, 35V	
C312	24232103 CD, 0.01μF, +80%, -20	)%
C313	24636101 EL, 100μF, 50V	70 day
		140.0

Location No.	Part No.	Description	sket i Milado T
CG61	24232103	CD, 0.01μF, +80%,	-20%
CG62	24538103	PF, 0.01μF	100
CG63		PF, 0.01μF	1.0
CG64		PF, 1500pF	
CG65	24633102	EL, 1000μF, 16V	
CH02		CD, 0.01μF, +80%,	-20%
CH03		CD, $0.01\mu$ F, +80%,	
CH04		CD, 0.01 $\mu$ F, +80%,	
CH06		CD, 0.01µF, +80%,	
CH07		CD, $0.01\mu\text{F}$ , $+80\%$ ,	
CH08		PF, 0.1μF	2070
CH09		CD, 0.01μF, +80%,	-20%
CH10		EL, 1μF, 50V	2070
CH11		EL, 1μF, 50V	
CH12		EL, 1μF, 50V	
CH12		EL, 1μF, 50V	
CH14		EL, 1μF, 50V	
		EL, 1μF, 50V	
CH15		•	200/
CH16		CD, 0.01μF, +80%,	-20%
CH17		EL, 33μF, 16V	200/
CH18		CD, 0.01μF, +80%,	-20%
CH19		EL, 1μF, 50V	
CH20		EL, 1µF, 50V	
CH21		EL, 2.2μF, 50V	
CH29	24436120		000/
CH31		CD, 0.01µF, +80%,	
CH32		CD, 0.01μF, +80%,	-20%
CH33		EL, 10μF, 16V	
CH34		EL, 33µF, 16V	
CH35		EL, 2.2μF, 50V	
CH36		EL, 4.7μF, 50V	
CH37		EL, 10μF, 16V	
CH38		EL, 330µF, 16V	1.11
CH40		CD, 0.01µF, +80%,	-20%
CH41		EL, 220μF, 16V	
CH42		EL, 1μF, 50V	
CH43		CD, 0.01μF, +80%,	
CH46		CD, 0.01μF, +80%,	-20%
CH60		CD, 270pF, ±10%	
CH61		CD, 270pF, ±10%	
CH62		CD, 270pF, ±10%	
CH63		EL, 1µF, 50V	
CH64		EL, 1µF, 50V	
CH65		EL, 1μF, 50V	
CH66		EL, 10μF, 16V	0001
CH70		CD, 0.01µF, +80%,	
CH71		CD, 0.01µF, +80%,	-20%
CH82		CD, 47pF	
CH83		CD, 47pF	
		DE 22000E	
CK01	24501222		
	24538683	PF, 0.068μF EL, 10μF, 16V	

Location No.	Part No.	Description
CK04	24633330	EL, 33μF, 16V
CK05	24633100	. EL, 10μF, 16V
CK06	24633100	EL, 10µF, 16V
CK07	24593222	
CR41	24636339	EL, 3.3μF, 50V
CR42	24232103	CD, 0.01µF, +80%, -20%
CR61		EL, 10µF, 50V
CR62	24232103	
CR71	24636339	EL, 3.3μF, 50V
CR72		CD, 0.01µF, +80%, -20%
CS01 12.005		EL, 470µF, 35V
CS02	24634102	
CS03	24635100	·
CS04	24794470	
CS07	24633470	EL, 47μF, 16V
CS08	24794470	EL, 47μF, 16V
CZO1	24094681	Capacitor Block, 2200pF x 4
		Capacitor Block, 2200pF x 4
CZO3	24094742	Capacitor Block, 1000pF x 4
0200	2 100 17 12	Supulifor Block, 1000pt X 4
		e de la companya del companya de la companya del companya de la co
RESISTOR	S	
•		
RO1	24366104	CF, 100k ohm
RO4	24366102	CF, 1k ohm
R05	24366682	CF, 6800 ohm
R06	24366682	CF, 6800 ohm
R07	24366681	CF, 680 ohm
R08	24366152	CF, 1500 ohm
R11	24366122	CF, 1200 ohm
R12	24366122	150.44
R13	24366122	CF, 1200 ohm
R19	24890682	CF, 6800 ohm, 1/4W
R26	24366102	CF, 1k ohm
		CF, 470 ohm
R29	24366471	
R30	24366471	CF, 470 ohm
R32		CF, 68k ohm
R35	24366223	
R36		CF, 22k ohm
R37		CF, 3300 ohm, 1/4W
R38		CF, 47k ohm
R39	24366472	CF, 4700 ohm
R101	24890821	CF, 820 ohm, 1/4W
R104	24366683	CF, 68k ohm
R105	24366221	CF, 220 ohm
R107	24366824	
R108	24890392	CF, 3900 ohm, 1/4W
R151	24061669	
R152	24061662	VR, 1M ohm, 1/8W
R161	24366101	CF, 100 ohm
R162		CF, 1k ohm

Location No.	Part No.	Description	
R163	24366562	CF, 5600 ohm	
R164	24366221	CF, 220 ohm	
R165	24366471	CF, 470 ohm	
R166	24366270	CF, 27 ohm	W.
R167	24366151	CF, 150 ohm	
R168	24366821	CF, 820 ohm	
R171	24890122	CF, 1200 ohm, 1/4W	1
R172	24366122	CF, 1200 ohm	
R201	24366271	CF, 270 ohm	
R202	24366152	CF, 1500 ohm	
R203	24890152	CF, 1500 ohm, 1/4W	,
R204	24366821	CF, 820 ohm	
R207	24366821	CF, 820 ohm	
R208	24366824	CF, 820k ohm	4
R209	24366104	CF, 100k ohm	
R210	24366152	CF, 1500 ohm	
R212	24366153	CF, 15k ohm	
R213	24366223	CF, 22k ohm	
R214	24366222	CF, 2200 ohm	
R215	24366393	CF, 39k ohm	
R216	24890562	CF, 5600 ohm, 1/4W	
R217	24366103	CF, 10k ohm	
R218	24366101	CF, 100 ohm	
R220	24366152	CF, 1500 ohm	
R224	24366153	CF, 15k ohm	
R225	24366103	CF, 10k ohm	
R226	24366332	CF, 3300 ohm	1.640
R227	24366102	CF, 1k ohm	
R228	24890244	CF, 240k ohm, 1/4W	
R229	24890562	CF, 5600 ohm, 1/4W	
R230	24366103	CF, 10k ohm	
R231	24366101	CF, 100 ohm	No.
R232	24366221	CF, 220 ohm	
R237	24890562	CF, 5600 ohm, 1/4W	
R238	24890103	CF, 10k ohm, 1/4W	
R240	24366223	CF, 22k ohm	
R241		CF, 100k ohm	
R242		CF, 680k ohm	
R243		CF, 100k ohm	
R252		VR, 200 ohm, 1/10W	
R253		VR, 200 ohm, $1/10W$	
R255		VR, 5k ohm, 1/10W	
R256	24060480	VR, 10k ohm, 0.15W	
R257	24060420	VR, 10k ohm, 0.15W,	
		Center Click	
R265	24366121	CF, 120 ohm	
R301	24366561	CF, 560 ohm	
R302		CF, 560k ohm	
R303	24945475	CC, 4.7M ohm, $\pm 10\%$ ,	1/4W
R304		CF, 10k ohm	
R306		CF, 680 ohm	
R307		CF, 56k ohm	
R308	24366393	CF, 39k ohm	•

			<del></del> -
Location No.	Part No.	Description	
R309	24366224	CF, 220k ohm	
R310		CC, 8.2M ohm, $\pm 10^\circ$	%. 1/2W
R311		CF, 27k ohm	
R315	24890223	CF, 22k ohm, 1/4W	
R316		CF, 680k ohm	
<b>△ R317</b>	24552102	OMF, 1k ohm, 1/2W	1
R319	24366182	CF, 1800 ohm	
R320	24366102	/	. 1
⚠ R321		OMF, 3600 ohm, 1/	
△ R322		OMF, 1300 ohm, 1W	t = t
<u> </u>	24983129	OMF, 1.2 ohm, 1W	
R324	24890153	/	
⚠ R327		FR, 10 ohm, 1W	
R328	24366332	CF, 3300 ohm	
△ R331	24552102	OMF, 1k ohm, 1/2W	
/\/\ R332		OMF, 1k ohm, 1/2W	
R333		CF, 330 ohm	100
R351 R352		VR, 200k ohm, 1/8W	
R381		VR, 50k ohm, 1/10W	/
R382		CF, 2700 ohm	
R383		CF, 10k ohm CF, 15k ohm	
R384		CF, 15k onm CF, 3300 ohm	
R385		CF, 4700 ohm	
R401		CF, 390 ohm	
R402		CF, 10k ohm	
R403		CF, 3300 ohm	
R404		CF, 2200 ohm, 1/4W	
R405		CF, 33k ohm	
R406		CF, 150k ohm, 1/4W	
$\Delta$ R407		OMF, 220 ohm, 1/2V	,
R408		CF, 1800 ohm	
<b>△</b> R409		OMF, 120 ohm, 1/2W	100
⚠ R410		OMF, 15k ohm, $\pm 2\%$ ,	
R411		CF, 33 ohm, 1/4W	
△ R416	24009992	OMF, 2k ohm, 3W	
<b>⚠ R42</b> 0	24553102	OMF, 1k ohm, 1W	
<u>^</u> R421	24553751	OMF, 750 ohm, 1W	
⚠ R425	24383562	OMF, 5600 ohm, 2W	
R430	SHADES THE CONTRACT OF THE PARTY OF THE SHADES	CF, 6800 ohm	
⚠ R431	24552432	OMF, 4300 ohm, 1/2	
<u>^</u> R440		OMF, 10k ohm, 1/2W	AND DESCRIPTION OF THE PARTY OF
⚠ R441		OMF, 10k ohm, 1/2W	
<u>^</u> R444 ^ R446	24982109	MF, 1 ohm, 1/2W	
<u> </u>		FR, 3.6 ohm, 1W	
R451 <u>^</u> R461	24061668	VR, 10k ohm, 1/8W	e de la companione
		OMF, 180 ohm, 1/2W	
R482 R501		CF, 10k ohm	]:
R501		CF, 820 ohm	
R502		CF, 2700 ohm, 1/4W	
R505		CF, 330k ohm	
R506		CF, 18k ohm, 1/4W CF, 1800 ohm	
	2.1000102	OF A TOOO OHIM A SAME	

Location No.	Part No.	Description	ultining Til
REO8	24366473	CF, 47k ohm	242
RE10		CF, 2200 ohm	
RE14		CF, 2200 ohm	
RE21		CF, 27k ohm	
RE22		CF, 27k ohm	
· ·		CF, 47k ohm	
RE24		CF, 22k ohm	weight.
RE25		CF, 3300 ohm, 1/4W	
RE35		CF, 2200 ohm	
RE36		CF, 82k ohm	
RE37		CF, 100k ohm	
RE38		CF, 39k ohm	
RE39		CF, 2k ohm	
		CF, 12k ohm	
1		CF, 12k ohm	
		CF, 4700 ohm	
		CF, 10k ohm	
RE44		•	
		CF, 27k ohm	
Į.		CF, 27k ohm	
		CF, 10k ohm	
i e		CF, 33k ohm, 1/4W	
•		CF, 33k ohm	
RF02		CF, 6800 ohm	Plane.
L		CF, 2700 ohm	
ł.		CF, 2700:ohm	<i>i</i> .
j.		CF, 2700 ohm	
RF07		CF, 2700 ohm	
RF08		CF, 2700 ohm	1.77
RF12		CF, 2200 ohm	
		CF, 2200 ohm	
		CF, 2200 ohm	128 SE
•		CF, 330 ohm	
RF46		CF, 330 ohm	18 FIF
RF47		CF, 330 ohm	
		CF, 220 ohm, 1/4W	
		CF, 620 ohm, 1/4W	0.03
		CF, 18k ohm, 1/4W	
		CF, 2200 ohm	
•		CF, 47k ohm, 1/4W	
j:		CF, 82k ohm, 1/4W	
		CF, 33k ohm, 1/4W	
		CF, 10k ohm	VASA
		CF, 10k ohm	
		CF, 2200 ohm, 1/4W	
		CF, 91k ohm	
		CF, 47k ohm	
		CF, 1k ohm	
		CF, 1k ohm	
		CF, 100 ohm	
		CF, 100 ohm	•
		CF, 10k ohm	
nu3/	24300103	CF, 10k ohm	JAL T

	<del></del>		<u> </u>
Location No.	Part No.	Description	ntilg vi Like
RG43	24366105	CF, 1M ohm	s (A)
RG44	24366102	CF, 1k ohm	
RG45	24890474	CF, 470k ohm, 1/4W	100
RG46	24890102	CF, 1k ohm, 1/4W	F
<u> </u>	24552431	OMF, 430 ohm, 1/2V	V-C
RG50	24066949	VR, 100k ohm, 1/10\	COLUMN COMPANIA COLUMN CONTRACTOR
RG51	24066952	VR, 10k ohm, 1/10W	
RG61	24890470	CF, 47 ohm, 1/4W	
RG62	24890122	CF, 1200 ohm, 1/4W	
RG63	24366102		
RG64	24366472	•	***
RG65	24366153		
RG66	24366102		
RG67	24366682	CF. 6800 ohm	
RG68		CF, 4700 ohm	
RG69	24366104	CF, 100k ohm	***
RG92		CF, 390 ohm, 1/4W	
RG93	and the second second	CF, 390 ohm, 1/4W	
RH01		CF, 47k ohm	
RHO2		CF, 47k ohm	
RH03	24366473		
RH04	24366103	CF, 10k ohm	
RH05		CF, 47k ohm	
RH06		CF, 3900 ohm	
RH07		CF, 3900 ohm	
RH08		CF, 47k ohm	4.1
RH09	24366103	CF, 10k ohm	
RH10	24366750	CF, 75 ohm	* 1
RH11		CF, 75 ohm	
RH12	24366750	CF, 75 ohm	
RH13	24366102		
RH14		CF, 75 ohm	
RH15	24366102		
RH16	24366820		12.1
RH17		CF, 10k ohm	1 1
RH18	24366103		• • •
RH19		CF, 100 ohm	
RH20	24366101	CF, 100 ohm	1 14,4
RH21	24366103		
RH25	24366102		
RH26		CF, 1k ohm	
RH28	24366332		1.111
RH30	24366222	CF, 2200 ohm	
RH31	24366103	•	
RH32	24366223	•	
RH33		CF, 3300 ohm	
RH34		CF, 1500 ohm	
RH35		CF, 9100 ohm	1100
RH36		CF, 3300 ohm	1. W 1.
RH37		CF, 10k ohm	A COLOR
RH38		CF, 10k ohm	31 3 a c 1
RH39		CF, 1800 ohm	
RH40	24366272	CF, 2700 ohm	12.5

Location No.	Part No.	Description
RH41	24366822	CF, 8200 ohm
RH42	24552561	OMF, 560 ohm, 1/2W
RH43	24366153	CF, 15k ohm
RH44		CF, 47k ohm, 1/4W
RH51	24066913	VR, 10k ohm, 1/10W
RH52	24066913	VR, 10k ohm, 1/10W
RH53	24066911	VR, 50k ohm, 1/10W
RH54	24069814	VR, 5k ohm, 0.08W,
		Center, Click
RH60	24366682	CF, 6800 ohm
RH61	24366472	
RH62		CF, 10k ohm
RH63		CF, 10k ohm
RH64		CF, 5600 ohm, 1/4W
RH65	-	CF, 1k ohm
RH66		CF, 5600 ohm, 1/4W
RH67		CF, 220 ohm
RH68	24366223	CF, 22k ohm
RH69	24366101	CF, 22k onm CF, 100 ohm
RH70		CF, 10k ohm
	5	
, RH71		OMF, 68 ohm, 1/2W
RH72		OMF, 270 ohm, 1/2W
RH73	24366562	CF, 5600 ohm
RH74	24366121	CF, 120 ohm
RH75		CF, 120 ohm
RH76	24366121	
RH77		CF, 10k ohm
RH78		CF, 10k ohm
RH80		CF, 10k ohm
RH81		CF, 10k ohm
RH82		CF, 10k ohm
	2/266221	CF, 220 ohm
RH83		
RH84	24366221	CF, 220 ohm
RH84 RH85	24366221 24366221	CF, 220 ohm
RH84 RH85 RH87	24366221 24366221 24366103	CF, 220 ohm CF, 10 ohm
RH84 RH85 RH87	24366221 24366221 24366103 24366750	CF, 220 ohm CF, 10 ohm CF, 75 ohm
RH84 RH85 RH87	24366221 24366221 24366103 24366750	CF, 220 ohm CF, 10 ohm
RH84 RH85 RH87 RH90 RH91 RH92	24366221 24366221 24366103 24366750 24890561 24366332	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm
RH84 RH85 RH87 RH90 RH91 RH92	24366221 24366221 24366103 24366750 24890561 24366332 24366103	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94	24366221 24366221 24366103 24366750 24890561 24366332 24366103	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 10k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24890103	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 10k ohm CF, 10k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24890103	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 10k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02	24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366103	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 10k ohm CF, 10k ohm, 1/4W CF, 22k ohm CF, 10k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366103 24366100	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 10k ohm CF, 10k ohm, 1/4W CF, 22k ohm CF, 10k ohm CF, 10k ohm CF, 10k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02 RK03	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366103 24366100	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 10k ohm CF, 10k ohm, 1/4W CF, 22k ohm CF, 10k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02 RK03	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366103 24366100 24366222 24366123	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 10k ohm CF, 10k ohm, 1/4W CF, 22k ohm CF, 10k ohm CF, 10 ohm CF, 10 ohm CF, 10 ohm CF, 12k ohm CF, 12k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02 RK03 RK04 RR43	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366103 24366100 24366222 24366123	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 10k ohm CF, 10k ohm, 1/4W CF, 22k ohm CF, 10k ohm CF, 10 ohm CF, 10 ohm CF, 10 ohm CF, 200 ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02 RK03 RK04 RR43 RR44	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366103 24366100 24366222 24366123 24366123	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 22k ohm CF, 10 ohm CF, 10 ohm CF, 10 ohm CF, 12k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02 RK03 RK04 RR43 RR44	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366100 24366222 24366123 24366473 24366472	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 22k ohm CF, 10 ohm CF, 10 ohm CF, 10 ohm CF, 12k ohm CF, 47k ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02 RK03 RK04 RR43 RR44 RR45 RR46 RR46	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366100 24366222 24366123 24366472 24366472 24366392 24366122	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 22k ohm CF, 10 ohm CF, 10 ohm CF, 470 ohm CF, 4700 ohm CF, 3900 ohm CF, 1200 ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02 RK03 RK04 RR43 RR44 RR45 RR46 RR46	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366100 24366222 24366123 24366472 24366472 24366392 24366122	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 22k ohm CF, 10 ohm CF, 10 ohm CF, 470 ohm CF, 4700 ohm CF, 3900 ohm CF, 1200 ohm
RH84 RH85 RH87 RH90 RH91 RH92 RH93 RH94 RH95 RK01 RK02 RK03 RK04 RR43 RR44 RR45 RR46 RR66	24366221 24366221 24366103 24366750 24890561 24366332 24366103 24366103 24366223 24366100 24366222 24366123 24366473 24366472 24366392 24366122 24366104	CF, 220 ohm CF, 10 ohm CF, 75 ohm CF, 560 ohm, 1/4W CF, 3300 ohm CF, 10k ohm CF, 22k ohm CF, 10 ohm CF, 10 ohm CF, 12k ohm CF, 47k ohm CF, 47k ohm CF, 4700 ohm CF, 3900 ohm

Location No.	Part No.	<b>Description</b>	
RR75	24366472	CF, 4700 ohm	
RR76	24366272	CF, 2700 ohm	
RR80	24366471	CF, 470 ohm	
RR81	24366101	CF, 100 ohm	
RS02	24890182	CF, 1800 ohm, 1/4W	
<u>∧</u> RS03 <u>∧</u> RS06		OMF, 39 ohm, 3W OMF, 0.47 ohm, 1W	
RS07	24366102	CF, 1k ohm	
<u>N</u> RS08	24982918	MF, 0.91 ohm, 1/2W	
COILS &	TRANSFOR	RMERS	
1.02	22262626	O-1 TD51007	ļ
L02		Coil, TRF1067	-
L03	23238920	Coil, Peaking, TRF4150AC	١
L102		Coil, PIF, TRF1452	
L103	23262881		ł
L105	23237993	Coil, Peaking, TRF4339AC	Í
L106		Coil, RF Choke, AZ9246E	İ
L107	23262961	Coil, PIF Trap, TRF1411	
L108		Coil, PIF Trap, TRF1457	j
L161	23261983	Coil, RF Choke, TRF9223	ļ
L162	23261986	Coil, RF Choke, TRF9220	I
L171	23262881	Coil, AFT, TRF1445	1
L201	23237987	Coil, Peaking, TRF4100AC	1
L406	23261974	Coil (Ferrite Bead), HC5-035	
L407	23238934		
L410	23221026		1
L411	565 222	Coil, Horiz. Linearity,	1
		TLN2072	1
L462	23227483	Deflection Yoke, AT6035/00	
L501	23237982	Coil, Peaking, TRF4270AC	
L502	23237985	Coil, Peaking, TRF4150AC	ł
L503	23237973	Coil, Peaking, TRF4151AC	ł
L551	23250972	Coil, 1H-Delay Matching,	ļ
		TRF5418	1
L552	23250972	Coil, 1H-Delay Matching, TRF5418	
L601	23237986	Coil, Peaking, TRF4120AC	
L661	23221058	Coil, RF Choke, TLN1015C	
L662	23221058	Coil, RF Choke, TLN1015C	
L663	23221058	Coil, RF Choke, TLN1015C	I
L801	23221075	Coil, RF Choke, TLN1015Q	١
L830	23261975	Coil, Choke, TRF9229	
L831	23221060	Coil, RF Choke, TLN1015E	l
L832	23221060	Coil, RF Choke, TLN1015E	
L901	23200791	Coil, Degaussing, Type 56170	THE STREET
LA11	23237999	Coil, Peaking, TRF4109AC	
LDO1	23201004	Coil, RF Choke, TRF9202B	1
LD02	23262855	Coil, PIF, TRF1453	1
LD03	23262881	Coil, AFT, TRF1445	
LD04	23237993	Coil, Peaking, TRF4339AC	1
	X.		Į.

Location No.	Part No.	Description
DA18	23115599	Diode, 1N4148
DA19	23115599	Diode, 1N4148
DA21	23115599	Diode, 1N4148
DA22	23115599	Diode, 1N4148
DA24	23115599	Diode, 1N4148
DA25	23115599	
DA26		Diode, 1N4148
DA91		Display (LED), MAN6410,
		Green
DEO2	23115599	Diode, 1N4148
DE21	23115599	Diode, 1N4148
DE22	23115599	Diode, 1N4148
DE23	23115599	Diode, 1N4148
DF07	23115599	Diode, 1N4148
DF08	23115599	Diode, 1N41.48
DG01	23115599	
DG04	23115599	
DG06		Diode, Zener, ZDP10
DG08	23118986	
DG09	23115599	
DG10	23115599	
DG10		Diode, 1N4148
DG12	23118969	
DG12	23118969	
DG14	23115599	
DG15	23115599	Diode, 1N4148
DH01	23115599	•
DH04	23115599	
DH05	23115599	
DH06	23115599	
DH07	23115535	
DH08	23115599	
DH09		Diode, 1N4148
DH10		Diode, 1N4148
DH11	23115599	• • •
DH12	23115599	
DKO1	23118482	
DR10	A8641942	
DR10	23115599	The state of the s
DR71	23115599	
DR90	23118969	
DS01	23115593	
DS01	23115593	Diode, 1N4002
DS02 DS03	23115593	Diode, 1N4002
DS03	23115593	Diode, 1N4002
DS04	23115598	Diode, 1N4003
	23115598	
DS06	23115598	
DS07		Diode, 1N4003
DS08	•	Diode, TN4003  Diode, Zener, BZX79B5V1
DS10	23110020	Diode, Zeliet, DZA/3DOVI

	Location No.	Part No.	Description
	MISCEL	LANEOUS	To the Committee Williams
2	∱ F601	23144898	Fuse, 3.15AT
	F601A	23845691	Clip, Fuse
2	£ F801 F801A	23144896 23845691	Fuse, T2.0A
	F801A	23045091	Clip, Fuse Fuse, T1.6A
Ľ	FS01A	23845691	
1	K902	23120764	Remote Hand Held Unit,
	K902	23120704	CT9140
l	P001	23142640	Aerial Terminal Socket,
ŀ	1001	20172070	AT909S
l	P661	23166180	Headphone Jack
	P661A	23163323	Nut
	<b>1</b> \	23176827	Cable, Twin
2	<b>∆</b> S801		Switch, Push, 2C1P
	SA01	23145588	Switch, Push, 1C1P
	SA02	23145588	Switch, Push, 1C1P
	SA03	23145588	Switch, Push, 1C1P
	SA04	23145588	Switch, Push, 1C1P
	SA05	23145588	Switch, Push, 1C1P
	SA06	23145588	Switch, Push, 1C1P
ŀ	SA07	23145588	Switch, Push, 1C1P
1	SEO1	23145475	Switch, Slide
L	SG01	23145781	Switch, Push, 2C2P
2	<u>∿</u> V901A	23116495	Socket, CRT, 12P
1	W201	23250951	Coil, Delay Line, TRF2048
	W661	23151399	Speaker, SPK-1130,
	14/000	20454200	6 x 12 cm, 4 ohm
	W662	23151399	Speaker, SPK-1130,
	W663	23151535	6 x 12 cm, 4 ohm Speaker, SPK-1075A,
	VV003	23191939	5 cm Round, 1900 ohm
	W664	23151535	Speaker, SPK-1075A,
1	******	20101000	5 cm Round, 1900 ohm
	X501	23153962	Crystal, 4.43MHz
	X502	23250949	Delay Line PAL Chroma, DL701
	XA01	23153949	
			TCR1003
ŀ	XA02	23153947	Crystal, 4MHz
1	XC01	23153924	Crystal, 6MHz
	Z101	A5611192	FIF SAW Filter, F1037C
	Z201	23107972	
			5.5MHz, TSP5.5MB
	Z202	23107913	Ceramic Filter, Video Trap,
-			6.5MHz, TCF1018
1	Z601	23107855	Ceramic Filter, 5.5MHz,
			TCF1031
	ZD01	and the second second second	MPX, SAW Filter, F1324D
ŀ	ZG01	23107856	Ceramic Filter, 5.74MHz,
			TCF1030
1			

Location No.	Part No.	Description
PC BOARI	O ASSEME	BLIES
U601	23169268	HEAD PHONE Board, PW4837
U602	23169274	SOUND MPX Board, PW4832
U901	23169270	CRT DRIVE Board, PW4835
U902	23331107	MAIN Board, PW5023
UA01	23331108	RMT/SELE. Board, PW5024
UA02A	23331110	CONTROL Board, PW5026-1
UA02B	23331111	LED Board, PW5026-2
UH01	23331112	21 PIN CONNECTOR Board,
		PW5027
UF01	23331113	TELETEXT Board, PW5028
UK01	23158254	IR AMP Board, PW4170

### PICTURE TUBE

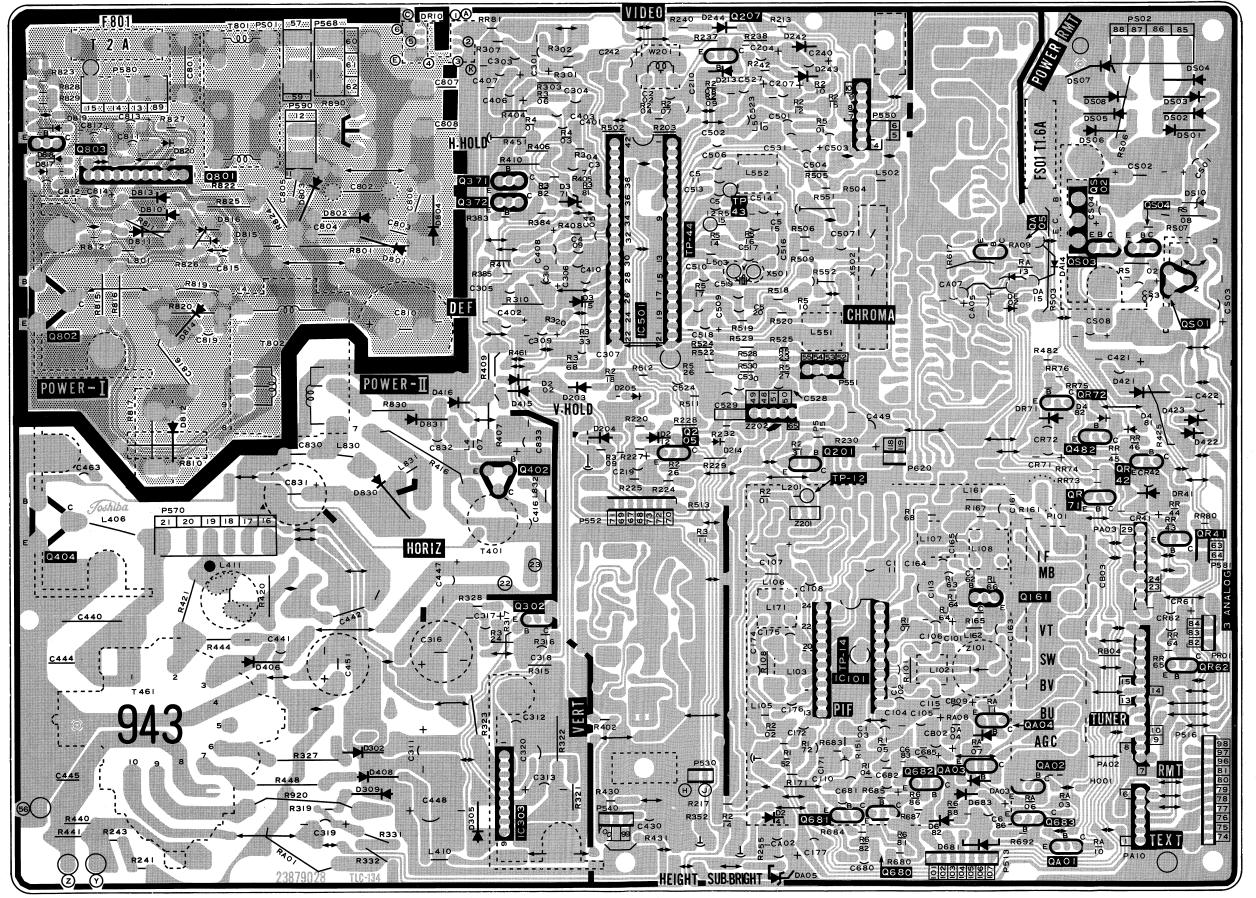
İ	45.0901	23112420	with Deflection Yoke	
	TUNER			
i	H001	23121774	Tuner, VHF/UHF, EG6:	13F

Location No.	Part No.	Description
· ·		
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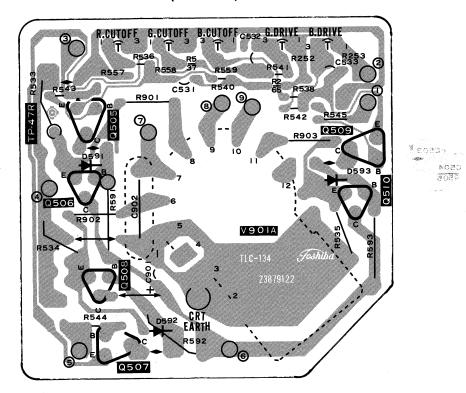
### MAIN BOARD PW5023

(Foil Side)



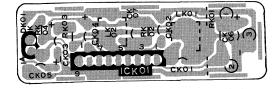
# **CRT DRIVE BOARD PW4835**

(Foil Side)



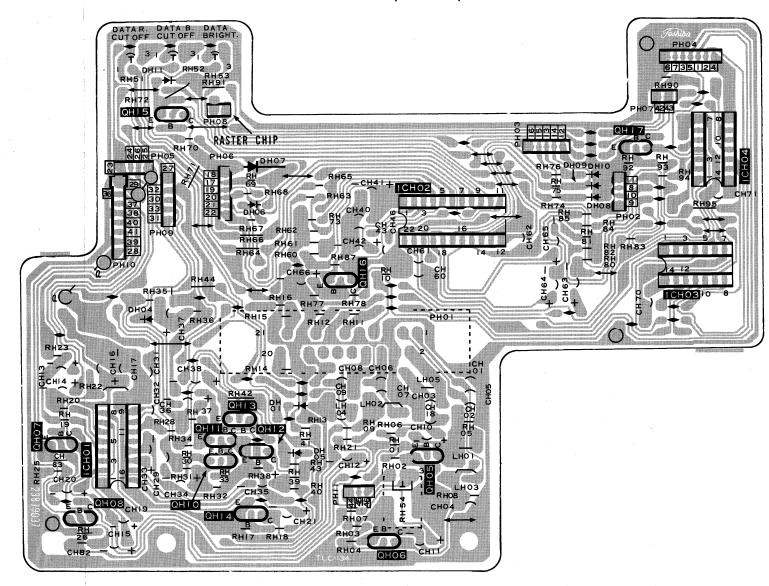
# IR AMP BOARD PW4170

(Foil Side)



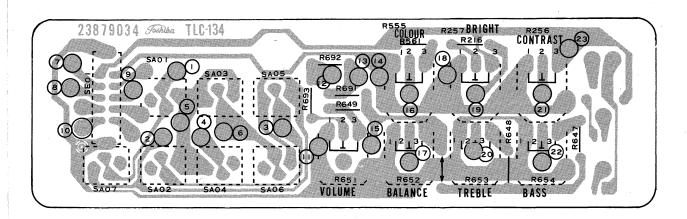
### 21 PIN CONNECTOR BOARD PW5027

(Foil Side)



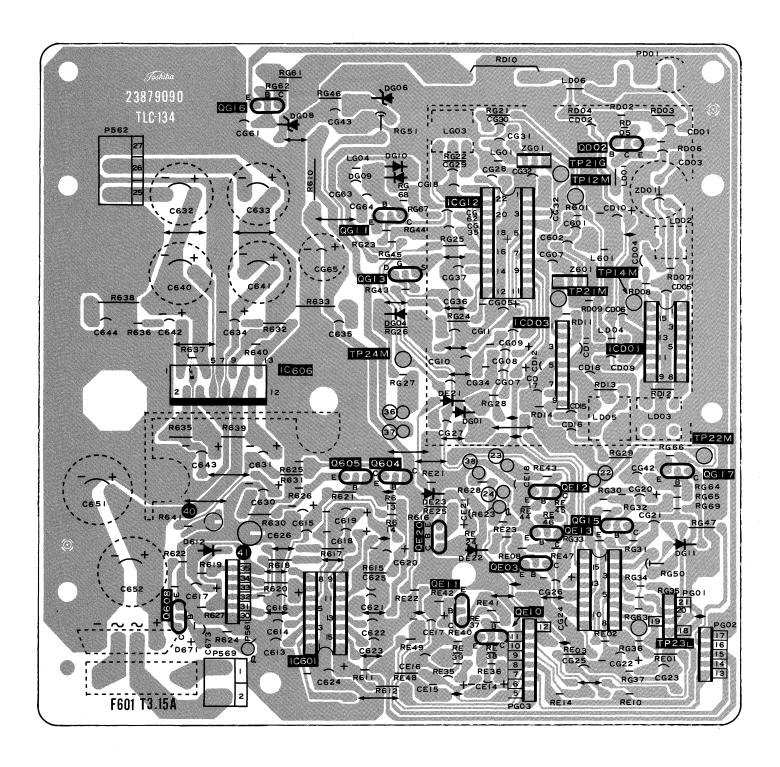
# **CONTROL BOARD PW5026-1**

(Foil Side)



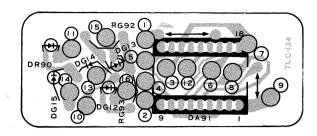
## **SOUND MPX BOARD PW4832**

(Foil Side)



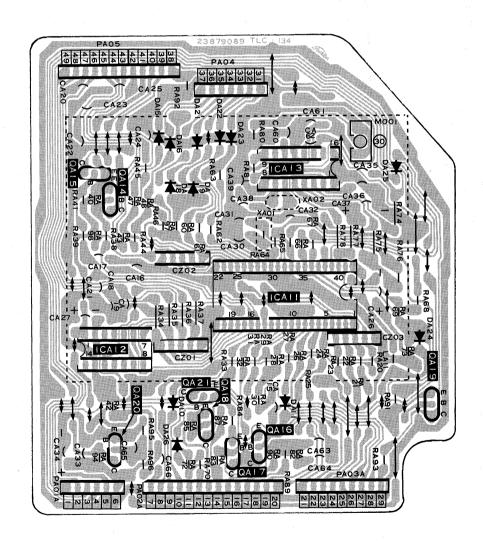
# LED BOARD PW5026-2

(Foil Side)



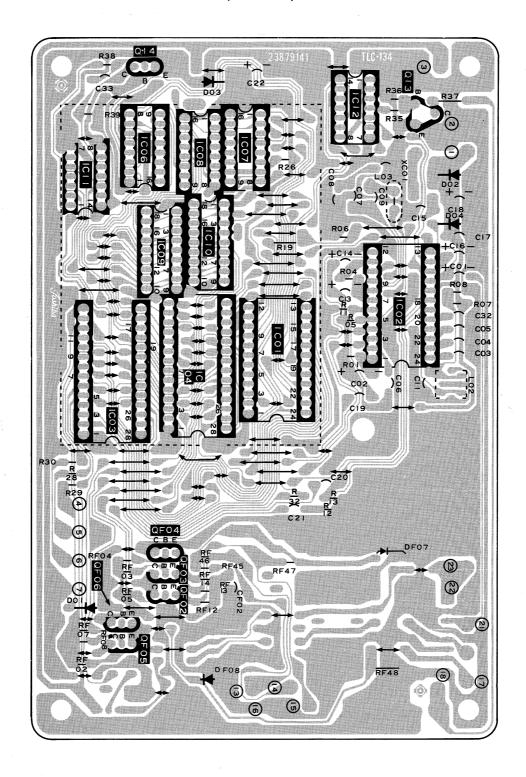
# RMT. SELECTOR BOARD PW5024

(Foil Side)



# **TELETEXT BOARD PW5028**

(Foil Side)



# TERMINAL VIEW OF TRANSISTOR

1 BC327 BC337 BC547A BC547B BC557A BC557B



- 2SK30ATM
- **(3**) BF871
- 4 2SC3678 2SB686

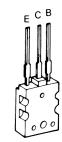












- 2SC388ATM 2SC1815
- 2SC2482





# 211T4W

SCHEMATIC DIAGRAM (2/2)

#### IMPORTANT SAFETY NOTE:

ed, be replaced by an approved type and must be mounted as the original and also it is essential that all cable forms be replaced in exactly the same position as when manufactured. This will ensure that the safety standards adhered to during manufacture will be maintained following any expectations are expectations.

#### **OBSERVATION OF VOLTAGES AND WAVEFORMS**

- 1. Voltage readings were obtained using a high impedance digital voltmeter.
- voltage readings were obtained using a high impedance digital voltneter.
   (一) or ground lead of instruments should be connected to the ground marked (上) in the shematic on checking Non-isolated circuit surrounded by mark but should be connected to the points marked ( ★ ) on checking isolated circuit.
- 3. The voltage readings may vary as much as ±20%.
- 4. Check that the Tuning, A.F.C., Brightness, Contrast and Colour controls are adjusted for the best picture, making sure that the Contrast, Brightness and Colour controls are set near to their mid-positions.
- 5. The waveforms were taken using a standard colour bar signal and were observed using a wide band oscilloscope via a low capacity probe.
- 6. Voltage reading in 21 PIN Corrector Board are measured with SE01 selected in the TV/21 PIN mode, unless otherwise noted.

1. This circuit diagram is subject to change without notice.

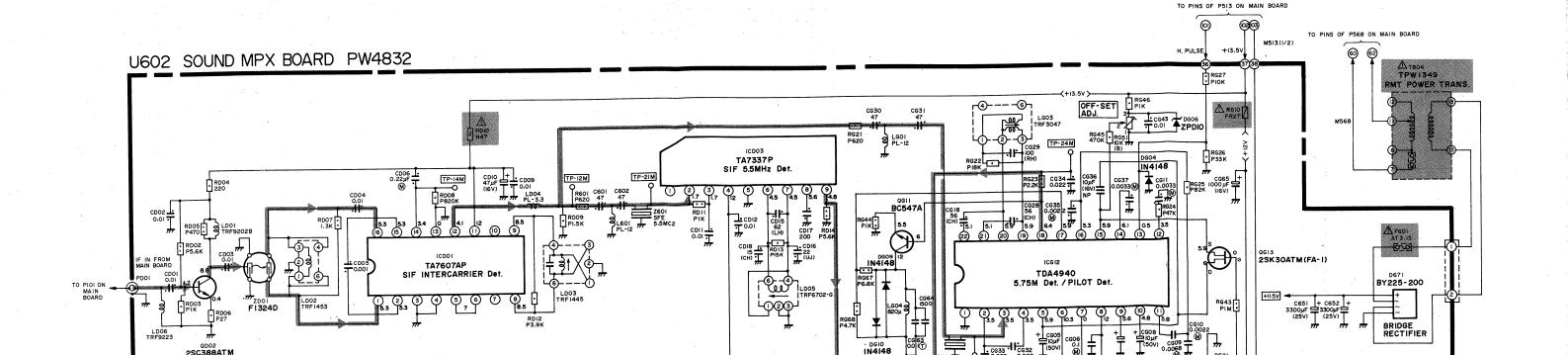
#### **EXPRESSION**

#### **VALUE OF RESISTOR, CAPACITOR and INDUCTOR**

- 1. Resistance is shown in ohm, k=1,000, M=1,000,000.
- 2. Unless otherwise noted in schematic, all capacitor values less than 1 are expressed in μF and the values more than 1 in pF.
- 3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in uH, and the values less than 1 in H.

#### **GROUNDING SYMBOL**

1. 1: Non isolated ground,  $\frac{1}{2}$ : Isolated ground.



# **RESISTORS**

relixed to values.						
TYPE	MARK					
Carbon Comp.	S					
Oxide Metal Film	R					
Ins. Carbon Film	Р					
Wire Wound	w					
Cement covered W.W.	NO MARK					
Fusible Res.	FR					

Buttixes to values:							
TOLERANCE	MARK						
±1%	(F)						
±2%	(G)						

#### Suffixes to VR values:

LAW	MARK
Linear	(B)
'C' Curve Characteristic	(C)

#### Rating Markings:

WATTAGE	MARK	WATTAGE
1/6W	<b>-●●</b>	3W
4 / 414	<b>—</b>	5W
1/4W		10W
1/2W		15W
1 W		20W
2W	-[2]-	25W

### Rating Markings:

**CAPACITORS** 

Type	Mark
Ceramic Disc 50V Only	٦۴
Electrolytic	-11 -11 -11
Electrolytic Non-Polar	-111-
Variable Capacitor	**
Other	41-

#### VOLTAGE READINGS OF ICHO3 AND ICHO4

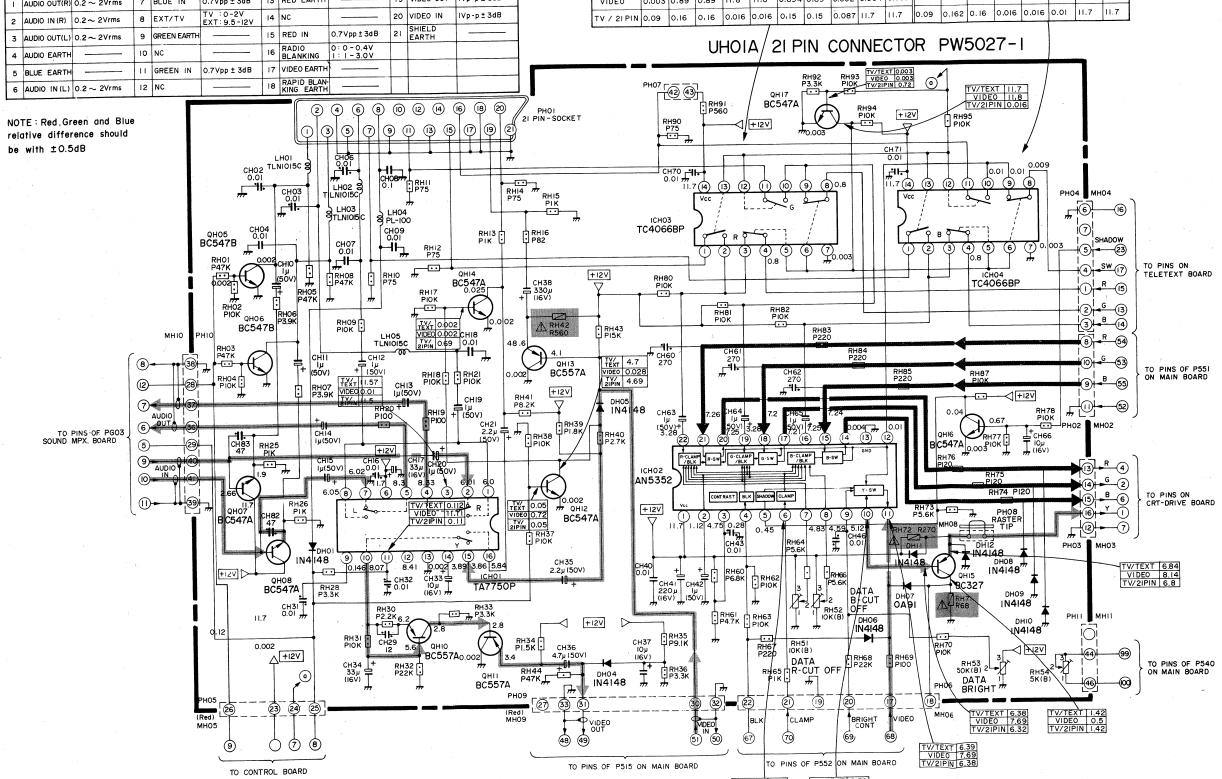
MARK

3 

10 15

\_\_\_\_\_\_25\_\_\_

- 1						- 1																								
				<b>.</b>	<del></del>							POSITION OF					ICH	03				1	1			ICH	04			
	21 PIN	SOCKET IN	/OU	T SIGNAL								SHOI	<del></del>	2	3	5	6	9	10	11	12	13		2	3	5	6	11	12	13
		SPECIFICATIONS		T		PIN	SIGNAL	SPECIFICATIONS	PIN	SIGNAL	SPECIFICATIONS	TV / TEXT	0.002	0.88	0.88	11.7	H. 7	0,89	0.89	0.002	0.003	0.003	0.003	0.89	0.89	11,8	11.7	0.003	0.003	0.003
		0.2 ~ 2Vrms	+				RED EARTH		+		IVp-p ± 3dB		1	1	1	1 1							-	0.88					0.003	0.003
			+		TV : 0-2V EXT: 9.5-12V	14			20	VIDEO IN	IVp-p±3dB	TV / 21 PIN																	11.7	11.7
_		0.2 ~ 2Vrms	+-	<del> </del>		<u> </u>	-	0.7Vpp ± 3dB		SHIELD		14 / 21 F 114	0.03	0.110	10110	0.0.0	7					——								
j	AUDIO OUT(L	0.2 ~ 2Vrms	9	GREEN EARTH				0: 0 - 0.4V	-	EARTH					1 11	401/	n / s	N PI	INI (	CON	INF	CTC	)R [	PW5	502	7-1	, !			
ŀ	AUDIO EARTH	·	10	NC		16	RADIO BLANKING	1: 1-3.0V	<u> </u>						Oi	1017	7/ 6	- 1 1 1											_	
_	DI UE EADTI		111	GREEN IN	0.7Vpp ± 3dB	17	VIDEO EARTH	₁} <u> </u>	ł	'			_				7				TV/TE	XT 0 003	3]	1						



## RESISTORS

#### Prefixed to values:

TETIAGO TO VOIGES!							
MARK							
S							
R							
Р							
W							
NO MARK							
FR							

#### Suffixes to valu

Builikes to values.	
TOLERANCE	MARK
±1%	(F)
±2%	(G)

#### Suffixes to VR values:

LAW	MARK
Linear	(B)
'C' Curve Characteristic	(C)

#### Rating Markings:

WATTAGE	MARK	WA
1/6W		
1/4W	<b></b>	
1/400		
1/2W		
1 W	-[1]	
2W		

ATTAGE	MARK	

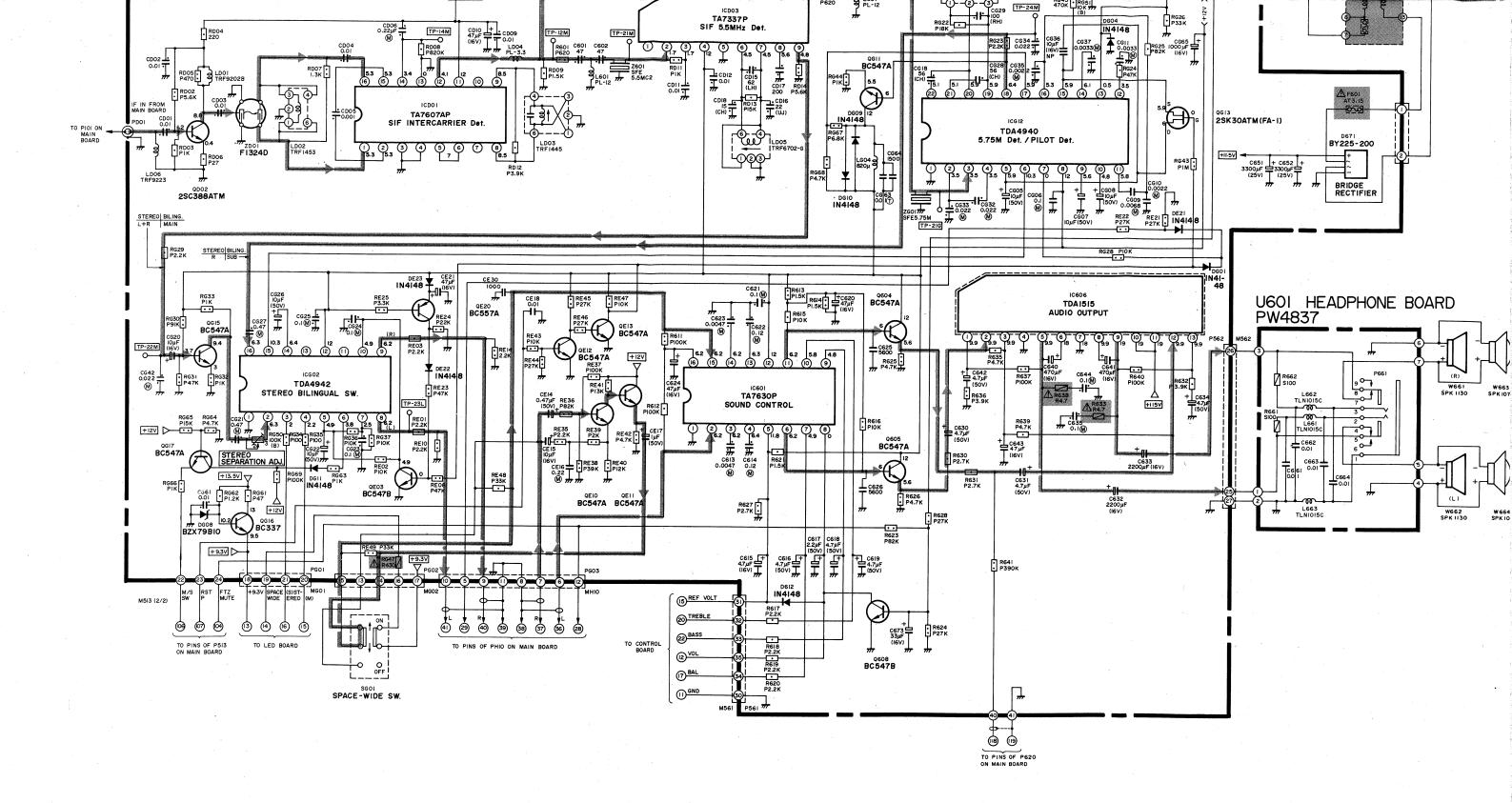
۱۱,	WATTAGE	MARK	
	3W	3	
	5W	5	
T	10W	<del>-</del> 10	
ſ	15W	<b>—</b> 15 —	
ſ	20W		
	25W		

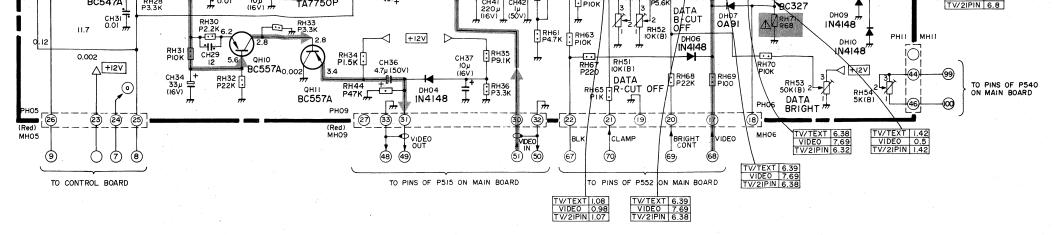
#### **CAPACITORS**

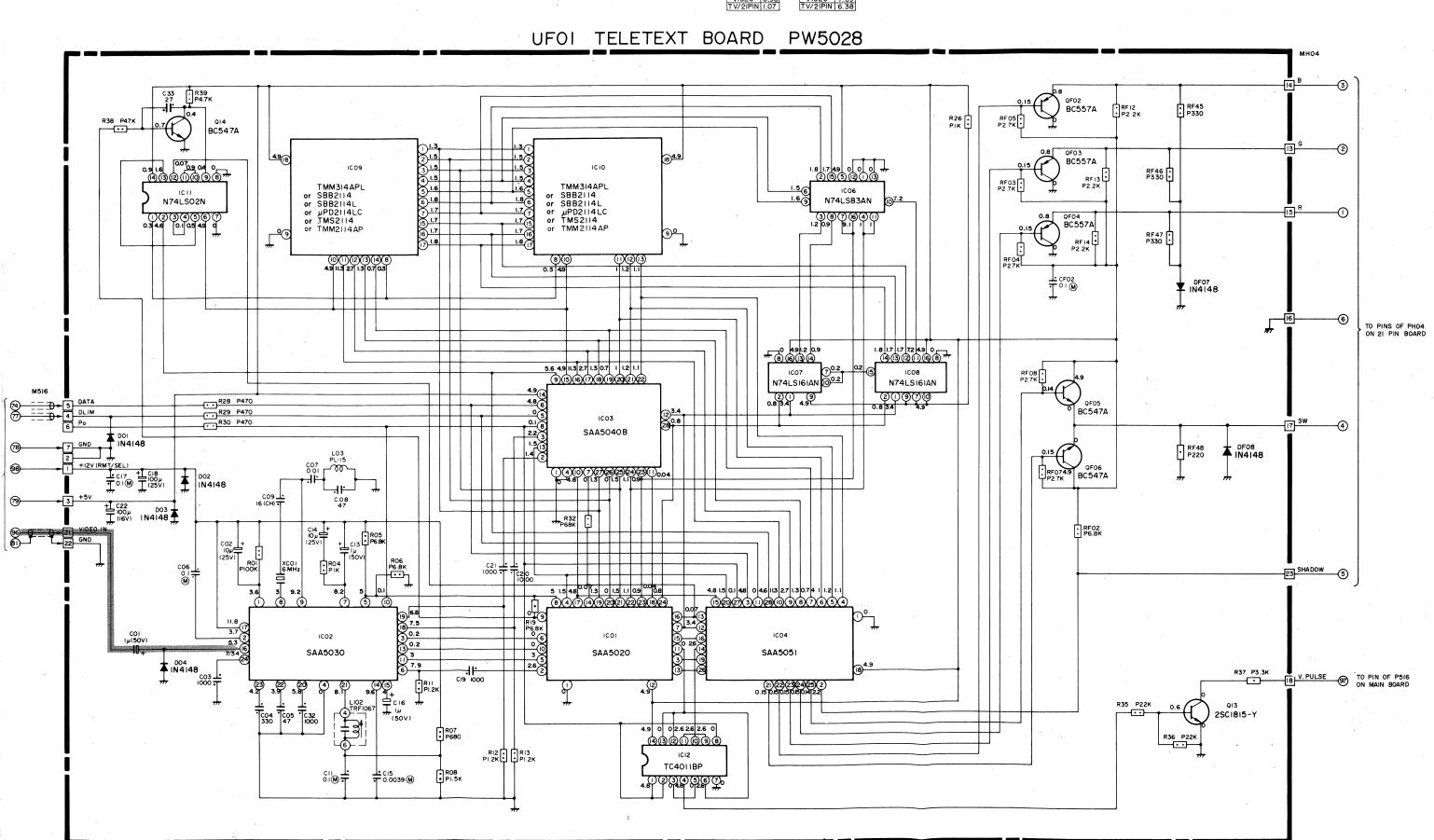
#### Rating Markings:

Tructing			
Type	Mark		
Ceramic Disc 50V Only	41-		
Electrolytic	- - - - - - - - - - -		
Electrolytic Non-Polar	-111- -111-		
Variable Capacitor	#		
Other	41-		

FR 'C' Curve Characteristic (C)	VOLTAGE READINGS OF ICHO3 AND ICHO4
21 PIN SOCKET IN/OUT SIGNAL	POSITION OF 1CHO3 1CHO4 SHOI   2   3   5   6   9   10   11   12   13   1   2   3   5   6   11   12   13
	TV / TEXT 0.002 0.88 0.88 11.7 11.7 0.89 0.89 0.002 0.003 0.003 0.003 0.89 0.89 11.8 11.7 0.003 0.003 0.003
I AUDIO OUT(R) 0.2 ~ 2Vrms 7 BLUE IN 0.7Vpp ± 3dB   13 RED EARTH -	9 VIDEO OUT IVP-p±3dB VIDEO 0.003 0.89 0.89 0.89 11.8 11.8 0.894 0.89 0.002 0.004 0.003 0.002 0.88 0.88 11.8 11.8 0.004 0.003
2 AUDIO IN (R) 0.2~2Vrms 8 EXT/TV TV :0-2V 14 NC -	TV / 21 PIN 0.09 0.16 0.16 0.016 0.015 0.087 11.7 11.7 0.09 0.102 0.102 0.105
3 AUDIO 001(L) 0.2~ 2V1118 9 01(LL) 0.2~	PRISON OF BIAN CONTINUES TO DIALECTOR DIALECTOR DIALECTOR DIALECTOR
TOTAL TOTAL	-3.0
5 BLUE EARTH — II GREEN IN 0.7VPP ± 3dB 17 VIDEO EARTH 6 AUDIO IN (L) 0.2 ~ 2Vrms 12 NC	PHO7 (42) (43) PHO7 (11.7) PHO
(2) (4)	PHOLOROPHICAL PROPERTY OF THE
NOTE : Red Green and Blue	
relative difference should be with ±0.5dB	3 7 9 10 13 15 17 19 21 PIN - SOCKE 1 PIOK PIOK PIOK PIOK PIOK
LHOI 5 CH	0.01
0.01	CH/O   11-4
0.01	15C   RH15   PH04 MH04
<b>""</b>     <sup>9</sup> πι	ICHO3 )
QH05 CH04 0.01 CH04 CH05 PM PM PM PM PM PM PM PM PM PM PM PM PM	CHO9 O,OI PB2 TC4066BP OR OF O
RHO1 0.002 CHIO	$\bullet$ 1   1   $^{\prime\prime\prime}$   $^{\prime\prime}$   $^$
Light Hosel	DB F RHIO # QHI4   FIZV RHBO   TC4066BP   CH38
	# Plok (6V) + (16V)
PIOK aug   RH06	T 1 (2)   PURI   RH82
MHIO PHIO	LH05 VIDEO 0.002 CHI8 " PISK P220 RS60 PISK P220
RHO3 P47K	CHI2 700 P220 P220 G 53
	+ (50V) RH18
7 <b>(3)</b> P3.9k V	
AUDIO + + + + + + + + + + + + + + + + + + +	PIOO 中PIOO T (50V)
SOUND MPX. BOARD 5 CH83 RH25 I JUSOV)	150V)   1
9 AUDIO 140 PIK CHIS IJI(50V)	
(a) - (b) - (c) -	6.02 01 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
(I) - 11/39   RH26	TV/TEXTIQUIZING D. TV/TQ 05 0002 CRT-DRIVE BOARD
BC547A C47	TV/TEXT   0.112
	CH433 RH64
	9) (i) (i) (i) (i) (ii) (ii) (iii) (iii) (iii) (iii) (iii) (iiii) (iiii) (iiii) (iiii) (iiii) (iiii) (iiiii) (iiiii) (iiiiii) (iiiiiiii
QHOS RHSS BC547A RHSS	0.146 8.07 8.41 0.002 3.89 3.86 5.84 1 0.002 3.89 3.80 3.80 3.80 3.80 3.80 3.80 3.80 3.80
■   F3.5k	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
CH31 7 0.01 77	P2.2K 6.2 PHI MHII
0,12	RH31 CH29
<del>   2</del> V	BC55/A0 002 3.4 4.7µ(50V) (16V) P22P ATT DRH68 MRH69 N N 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
	TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD  TO PINS OF P540 ON MAIN BOARD
PHO5 (26) (33) (29) (25)	
(Red) (26) (29) (25) (MH05)	(Red)  VIDEO  VI
9 7 8	(51) $(50)$ $(67)$ $(70)$ $(69)$ $(68)$
	TO PINS OF P515 ON MAIN BOARD  TO PINS OF P552 ON MAIN BOARD  TO PINS OF P552 ON MAIN BOARD  TV/TEXT [6.39] VIDEO [7.69] TV/2[PIN 6.38]
TO CONTROL BOARD	TV/TEXT[.08] TV/TEXT[6.39]







# 211T4W

# SCHEMATIC DIAGRAM (1/2)

#### IMPORTANT SAFETY NOTE:

Components marked with the International Hazard Symbol  $\triangle$  and shaded must, if changed, be replaced by an approved type and must be mounted as the original and also it is essential that all cable forms be replaced in exactly the same position as when manufactured. This will ensure that the safety standards adhered to during manufacture will be maintained following any servicing procedure.

#### **OBSERVATION OF VOLTAGES AND WAVEFORMS**

- 1. Voltage readings were obtained using a high impedance digital voltmeter.
- (一) or ground lead of instruments should be connected to the ground marked (土) in the shematic on checking Non-isolated circuit surrounded by mark but should be connected to the points marked ( ★ ) on checking isolated circuit.
- 3. The voltage readings may vary as much as ±20%.
- 4. Check that the Tuning, A.F.C., Brightness, Contrast and Colour controls are adjusted for the best picture, making sure that the Contrast, Brightness and Colour controls are set near to their mid-positions.
- 5. The waveforms were taken using a standard colour bar signal and were observed using a wide band oscilloscope via a low capacity probe.

#### NOTES:

1. This circuit diagram is subject to change without notice

#### EXPRESSION

#### **VALUE OF RESISTOR, CAPACITOR and INDUCTOR**

- 1. Resistance is shown in ohm, k=1,000, M=1,000,000.
- 2. Unless otherwise noted in schematic, all capacitor values less than 1 are expressed in  $\mu F$  and the values more than 1 in pF.

**RESIST** 

Prefixed

Ca

Oxid

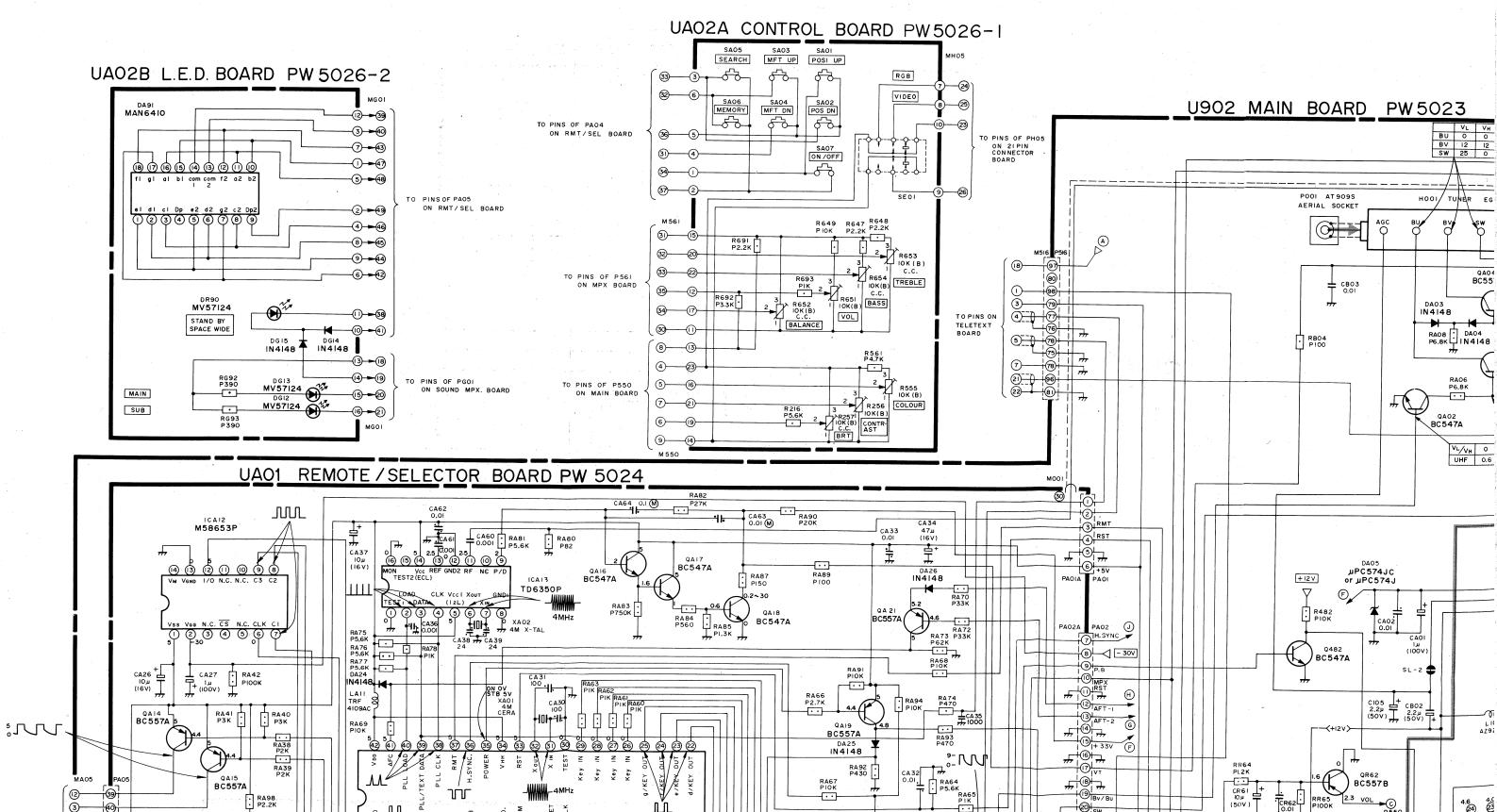
Ins.

Cemer

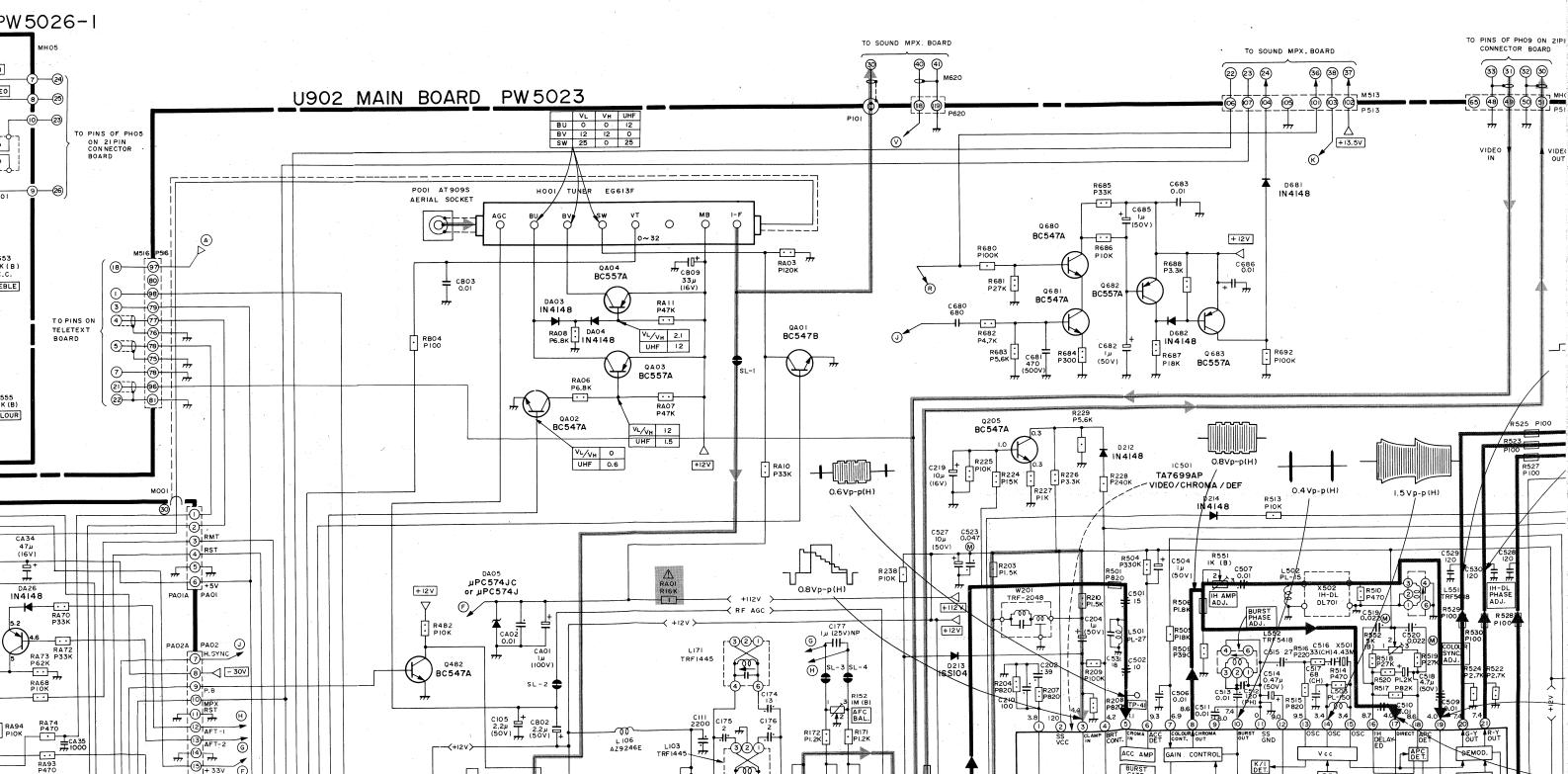
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in  $\mu$ H, and the values less than 1 in H.

#### **GROUNDING SYMBOL**

1. ↓: Non isolated ground, ; : Isolated ground.



**CAPACITORS** Rating Markings: Rating Markings: RESISTORS NOTES: WATTAGE MARK WATTAGE MARK Suffixes to values: 1. This circuit diagram is subject to change without notice. Prefixed to values: Ceramic Disc 50V -[3]-1/6W ----3W MARK TYPE MARK **TOLERANCE** Electrolytic 5 5W ±1% (F) Carbon Comp. **EXPRESSION** 1/4W Electrolytic 10 10W ±2% (G) R Oxide Metal Film Non-Polar VALUE OF RESISTOR, CAPACITOR and INDUCTOR 15 15W 1/2W 1. Resistance is shown in ohm, k=1,000, M=1,000,000. Ins. Carbon Film Suffixes to VR values: Variable Capacit 2. Unless otherwise noted in schematic, all capacitor values less than 1 are expressed in -1 20W 20 W Wire Wound LAW MARK µF and the values more than 1 in pF. 25 W 25 Other 2 3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in 2W NO MARK Cement covered W.W. (B) Linear  $\mu H$ , and the values less than 1 in H. Fusible Res. (C) 'C' Curve Characteristic **GROUNDING SYMBOL** 1. ⊥: Non isolated ground, ; Isolated ground.



### CAPACITORS

**Rating Markings:** 

#### Rating Markings:

 Suffixes to values:

 TOLERANCE
 MARK

 ±1%
 (F)

 ±2%
 (G)

#### Suffixes to VR values:

IARK

R

LAW	MARK
Linear	(B)
'C' Curve Characteristic	(C)

	WATTAGE	MARK
	1/6W	
	1/4W	<b></b>
	1/2W	
	1 W	-(1)-
	2W	

WATTAGE

5W

10W

15W

20W 25W MARK

5

20

25

Type	Mark
Ceramic Disc 50V Only	4F
Electrolytic	-11 ⊩ -14 ⊩
Electrolytic Non-Polar	-111-
Variable Capacitor	#
 Other	41-

